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ON THE RETURNS OF PRODUCTIVE AGENTS AND ON THE PRODUCTIVITY OF CAPITAL IN PARTICULAR.

SUMMARY.

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I.

On the Returns of Productive Agents in General.

In the masterly study which he has published on the question of diminishing returns, Professor Carver has maintained that the tendency toward diminishing returns

does not manifest itself, as was formerly believed, simply with relation to productive agents combined in varying proportions with a fixed quantity of land, but that this tendency is something universal.[1] Take any productive agent or group of productive agents. If with this agent, or group of agents, which we suppose fixed, we combine successively increasing quantities of that other agent or those other agents which must be added to it to obtain such and such sort of goods as one wishes to have, then, according to Carver, the product will, to be sure, increase more quickly at first than the productive agent or agents which have been varied; but a time will come when the increase of the product will be less rapid than that of our agent or agents, when the returns of the latter, in other words, will relatively diminish.

I consider Carver's thesis true, and, moreover, I consider that it constitutes one of the most important truths of economic science. At the same time, Carver, in expounding his ideas on the problem of diminishing returns, has expressed a view which I regard as inexact, at least partially. My intention here is to point out this error which I think I see in Carver's work, and at the same time to contribute towards clearing up the question, till now so hazy, of the productivity of capital.

Carver illustrates the "law" of diminishing returns with the following formulæ:—

If x acres of land with y units of capital and labor give p product, x acres of land with ay units of capital and labor will give a product superior to p, but inferior to ap.

If y units of capital and labor with x acres of land give p product, y units of capital and labor with ax acres of land will give a product *superior* to p, but inferior to ap.

[1] See Carver, The Distribution of Wealth (1904), chap. 3.

When, the quantity of land remaining the same, says he, the quantity of labor and capital is increased, the product *does not increase* as much as the labor and capital. If the quantity of labor and capital does not change and the quantity of land is increased, the product will not increase as much as the land.[1]

If I understand Carver's thought, one productive agent remaining constant and the others increasing, the product, from the moment when the tendency to diminishing returns begins to act, will increase less quickly than these productive agents. It will increase less and less quickly, but *it will continue incessantly to increase.*

Carver, on the point which I wish to discuss, has, in short, only universalized the conception which many theorists had expressed before him, with regard to agricultural returns. Read, for example, Marshall. "The application of increased capital and labour to land," writes that author, "*adds* a less than proportionate amount to the produce raised."[2]

To be sure, other economists had had a somewhat different conception. Their opinion was that, by the application, to a given area of land, of increasing quantities of capital and labor, one must arrive, after a certain time, at a maximum product, and that afterwards production must necessarily remain stationary. Among the authors who have treated of population, certain ones have shown that they imagined a "fulness of cultivation," an extreme limit for the production of the means of subsistence. Such is the case of Wallace.[3] Turgot writes: "The earth has a limited fertility, and supposing it ploughed, manured, marled, ditched, irrigated, weeded as much as it can be,

[1] Pages 67–68. The italics are mine.

[2] Principles of Economics, 5th ed., p. 153 (IV., 3, § 1). It is I who italicise the word "adds."

[3] See his Dissertation on the Numbers of Mankind in Ancient and Modern Times (1753), *passim*.

it is evident that all further expense would be useless;[1] . . . there is then a maximum of production which it is impossible to go beyond, and when it has been reached, advances produce absolutely nothing." [2] Assuming a specially technical point of view, Liebig taught that, beyond a certain measure, all supplementary ploughing and manuring was powerless to increase the production of plants.[3] Quite recently an author who, like Carver, proclaims the universality of the tendency to diminishing returns, Valenti, said, in a quite general manner, that the increase of any one agent in a combination of productive agents, after a certain point, adds nothing to the product.[4]

To say that the quantity of the product, when one productive agent remains invariable and the quantity of the others increases, augments indefinitely, but less and less, and to say that it increases to a certain maximum to remain stationary afterwards, amounts to about the same thing. What I wish to establish is that both propositions, in so far as they are general propositions, are false.

Grant that

(1) x units of a group of productive agents with y units of another group give p product,

it can then be granted that

(2) ax units of the first group with ay units of the second group give ap product.

Perhaps, indeed, it will be said that the process from

[1] Turgot adds here, "Such increase might even be harmful." One might be tempted to see in these words an anticipation of the conception which I am going to state presently. I do not think, however, that they have that meaning.

[2] Observations sur un mémoire de M. de Saint-Péravy (Œuvres de Turgot, éd. Daire, i., p. 420).

[3] According to Esslen, Das Gesetz des abnehmenden Bodenertrages seit J. von Liebig, Munich, 1905, pp. 8–9.

[4] Principii di scienza economica (Florence, 2d ed., 1909), § 62, p. 167. The way in which Valenti formulates his proposition is not very happy, as may be seen by consulting his book.

formula (1) to formula (2) is not legitimate. When an enterprise is enlarged by the proportionate multiplication of all the productive agents which are employed in it, the product may be found to be increased more or less than the productive agents in question. But to this observation I shall reply by assuming that the process from my first formula to my second formula does not necessarily express the process from a relatively small enterprise to a larger enterprise. There is no reason why the second formula should not relate to enterprises like that—or those—to which the first related, but a times as numerous.[1] And under this hypothesis, I may add, it will surely be true.[2]

We know on the other hand that the return of a productive agent or group of agents, when these agents increase in proportion to the others, may increase at first. We can thus have:—

(3) x units of one group of productive agents with ay units of another group give $a'p$ product, which is larger than ap.

Let us compare formulæ (3) and (2). This comparison will show us that, if with a fixed quantity—ay—of a certain group of productive agents we combine increasing quantities of other agents,—1 at first and a afterwards,—we may see a decrease not only in the relative return of these agents, but *in the absolute product.*

[1] Carver expresses at first the "law of economies of large production," saying (p. 66) that if, for example, x acres of land with y units of capital and labor give P product, ax acres of land with ay units of capital and labor will give either more than aP or less than aP. These formulæ relate to simple enterprises; but nothing in them shows it.

[2] After having expressed the "law of economies of large production," as we have seen in the preceding note, Carver, coming back to this law, says (pp. 90–91) that, when an enterprise is enlarged, the relation changes between a certain factor of the production, the management, which remains fixed, and the *ensemble* of the other factors. In that way, he thinks, he can reduce the law of economies of large production to that of the variation of returns. It seems to me it would be necessary to make some reservations upon this reduction,—this is not the place to state them,—but it certainly contains some truth.

Thus this proposition, very different from that of Carver on the same question, is drawn from the very fact of increasing returns,—a fact acknowledged by Carver. There is, moreover, in the latter's book a passage in which the truth which I am trying to establish appears clearly enough. Carver somewhere [1] considers a production which would employ land and labor. If the land is gratuitous, he says, it will be advantageous to extend the labor over as much land as is necessary in order that this labor may give the maximum product. And, if we consult the table to which Carver refers us,[2] we can see that by extending the same labor over a larger quantity of land we shall have less product. The table in question shows us that, if we apply labor over 10 acres of land, it is for an outlay of 20 days' labor that the return from the labor will be the greatest. If we lay out 20 days' labor, each day will produce 19 bushels of grain, whereas with 10 days' labor, or with 40, the number of bushels produced per day will be only 15. Suppose, then, that we have at our disposal 20 days' labor. If we lay it out on 10 acres, we shall obtain 20×19 bushels, or 380. Or shall we lay it out on 20 acres? 10 days laid out on 10 acres give 10×15, or 150 bushels. 20 days laid out on 20 acres will give twice as much, or 300 bushels. And thus it is better, having at our disposal 20 days, to lay them out on 10 acres than on 20.

I think I have established that the increase of one factor or group of factors of production, the other factors remaining constant, might result in a diminution of product. Let us now look to experience for examples.

Here is a field of a certain area. If we apply to it indefinitely increasing quantities of labor, what will the product become? One may say that it will increase indefinitely. It can even be always increased, it would

[1] Page 71. See also pp. 72–73. [2] Page 58.

seem, by more minute care given to the plants; only, after a certain time, this increase will become extremely slow. In any case the product will never be found to diminish.[1]

It is the above case, it will be noted, which almost exclusively occupied the authors who, before Carver, have speculated on diminishing returns. We must not, then, be surprised if Carver, universalizing the views of these authors, has been led to think that the increase of one productive agent, the others remaining constant, could not diminish the product. But let us imagine that we lay out our fixed quantity of labor on greater and greater tracts of land, that we make 10 men, for example, cultivate 5 hectares in grain, then 10 hectares, then 100, then 1,000, then 10,000. The product which they will be able to obtain—if, in proportion as the land to be cultivated becomes vaster, they force themselves to spread their labor over all the land that is given them—will diminish after a certain time. It will even finally become nil.

Another example. An individual devotes all his activity to the directing of an enterprise. Let us suppose that the enterprise enlarges indefinitely. After a certain time the increasing difficulty which our individual will experience both in organizing and in overseeing the conduct of his business may, and doubtless must, have as a consequence not only a diminution in the productivity of the different agents employed, but a diminution in the absolute product.[2]

To have done with my general remarks, I shall offer an observation apropos of the demonstration that Carver gives us of the universality of the law of diminishing returns.[3] Let us suppose, says Carver, that this law is

[1] It might, however, be remarked that a time will come when there will no longer be room in our field for a greater number of men.

[2] I am considering here productivity and product from the point of view which certain authors call technical. I do not take into consideration that diminution in the value of products which may result from the necessity of going to seek more distant markets and from the descendant form of the curve of demand. The consideration of this additional datum of the question would corroborate my assertion.

[3] Pages 67–68.

verified for certain productive agents, in so far as they are combined with others which remain fixed. It will then be true with relation to these latter, inasmuch as they are made to vary and as the former remain stable. Let us state, for example, these two formulæ:—

(1) x units of a certain productive agent with y units of another agent give P product;

(2) x units of the first agent with ay units of the second give more than P.

On the other hand, one can write:—

(3) ax units of the first agent with ay units of the second give aP product.

Now the comparison of formulæ (2) and (3) shows that, given a certain quantity of units of the second agent,—or ay,—if the number of units of the first is raised from 1 to a, the product increases in a less proportion. In other words, that certain increases of the first agent are accompanied by a decrease of the returns which it gives.

Carver here neglects the case, which might occur, where we should have:—

(4) x units of the first agent with ay units of the second give less than P.

If we compare formulæ (3) and (4), we shall see that certain increases of the first productive agent, the second remaining constant, are accompanied by increasing returns of the former.[3]

[3] The demonstration which I have just pointed out is the inverse of the one above by which, starting from the fact of increasing returns, I proved that certain increases of productive agents might be accompanied by an absolute diminution of the product.

One more remark. If we combine two productive agents, M and N, it is only for relatively large quantities of N that the increase of N will be found to bring about the diminution of the product. It follows that it is only for relatively small quantities of M that the returns of this factor will be found to increase with its augmentation. And the converse is also true.

II.

On the Productivity of Capital.

1. *Definition and Measure of Capital.*

I wish to examine now how the product varies when the relation of capital to the other productive agents changes. But, before proceeding to this examination, it is indispensable to determine carefully what capital is as a distinct productive agent, how it must be defined and measured if we wish to be able to speak of a relation between capital and the other productive agents.

Let us cast a glance at the writings of the economists who have treated of diminishing returns. It is a fact worthy of remark that these authors, at least in the passages relative to the variations of returns, do not explain what they mean by the word "capital." Turgot, in the passage which I have quoted,[1] speaks of the relation of the product to the "avances"; and by this word he designates the capital and labor applied to land without making between these two things any distinction. West, in his Essay on the Application of Capital to Land,[2] announces to us[3] that he is going to study, as the title of his work indicates, the variations which are produced in the returns of capital when one applies more and more capital to the land. But immediately[4] he begins to speak to us not of the returns of capital, but of the returns of labor. He asserts that labor, in agriculture, gives diminishing returns.[5] Malthus, when he deals with agricultural returns, considers sometimes capital applied to land, sometimes capital and labor.[6] Ricardo speaks here of capital or of labor, or of capital and labor, in an

[1] Œuvres, éd. Daire, i. pp. 418–422. [2] 1815. [3] Page 2.

[4] As early as p. 3. [5] Pages 6 and 7.

[6] The Nature and Progress of Rent (1815), pp. 17, 29, 36, 41; Principles of Political Economy (1st ed., 1820), pp. 153–197.

apparently indifferent manner.[1] Similarly, Stuart Mill.[2] Marshall takes care most frequently to speak of the doses of capital and labor applied to the land,[3] but he sometimes lets fall one of these terms.[4]

Among the more recent authors, Bullock,[5] Carver, Valenti, always distinguish capital and labor; but, in what they have written on diminishing returns, no very precise indication is to be found about the way in which they distinguish these two notions.

I mean by no means to maintain that the economists whom I have reviewed have all failed to form a clear conception of capital. For several of them such an assertion would be entirely false. But there are some among the authors I have quoted of whom this is quite the case. And I shall say more: among those who have had a clear conception of capital it seems that certain ones had a vague feeling that their conception of capital was not the one which permits us to assign capital its place in the theory of diminishing returns, and, in a broader way, in the theory of production. At least, one is tempted thus to interpret the hesitation, the indecision, which is manifest in the formulæ which they use.

What, then, is capital, after all, for these authors who have busied themselves especially with the productivity of capital, with the rôle of capital in production? Ordinarily, the authors in question make capital consist of those goods which are employed in production and which have been produced. Capital consists, to use the ex-

[1] Principles, chap. 2. See, for example, the end of paragraph in Gonner's edition (1891).

[2] Principles, notably IV., chap. 3.

[3] Principles, I., chap. 12, paragraphs 1–2.

[4] See, for example, p. 155, n. 2 (IV., chap. 3, paragraph 21.

[5] The Variation of Productive Forces (Quarterly Journal of Economics, August, 1902).

pression of Böhm-Bawerk, of intermediary products.[1] And thus those economists who recognize only labor as the original factor of production, or who at least, in their speculations on production, are inclined to pay particular attention to labor, and to assign it a preponderant place, will say that capital is past labor collaborating with present labor. A cultivator, for example, expends labor to plough his land; but, in order to plough, he needs a plough. This plough, which has been constructed a longer or shorter period before, is capital; it represents past labor, the help of which renders more efficacious the labor at present being expended by our ploughman.

Such is the conception of capital most frequent among the theorists of production. With regard to this conception it seemed to me necessary to make one remark at the very start. If one is to employ, in the theory of production, the concept of intermediary product, it is important that one should understand this concept in the broadest manner. Suppose some men are breaking land in order to permit it to produce harvests: this improvement of the land which will result from the breaking will have to be regarded as an intermediary product. It is this which the labor of our men produces immediately—if one may be permitted the expression—and will contribute afterwards to the production of harvests. In capitalistic production, Böhm-Bawerk teaches us, man does not create in a direct manner the property which he desires. He resorts to detours. Very well. But what must be noted is that these detours do not always consist in creating, in the strictest sense of the word, "goods" from which the former will come, I mean in producing isolable goods.

How can the intermediary products be measured? Our authors measure them by what they have cost to

[1] In German, *Zwischenprodukte*.

obtain. Thus, wishing to estimate the capital (that is to say, the intermediary product) which a laborer employs, they will consider often the labor which is incorporated in this intermediary property; they will estimate that past labor which collaborates with present labor.[1]

But, then, how can the relation be established of capital to the other productive agents? Here several solutions may be imagined. Let us examine them in order.

1. Suppose a cultivator who cultivates his field for a year. Let us say that for his cultivation he employs land, labor, and capital; and by this last word let us understand, for example, the machines, the instruments which our cultivator has acquired for his exploitation. If our cultivator pays 10,000 francs for the rent of his field, if he expends 20,000 francs for manual labor and 20,000 for the machines, instruments, etc., we may say that the expense in capital is to the other expenses as one to two. As one may see, we are considering here one group of productive operations neglecting the operations which have preceded these and which technically form a part of the same productive process. Let us suppose that our cultivator before undertaking his cultivation has himself manufactured the machines and the instruments which he will have to use. Then, with the manner of reckoning which I have indicated, the capital will disappear. In such conditions it is apparent that this manner of reckoning implies a contradiction; for to concentrate attention to a certain stage of a productive process is to invite us—the very use which is made here of the expression "intermediary products" shows it plainly enough—to go back further than this stage.

[1] See, for example, Thünen, Der isolirte Staat, 2d part, 1st division, paragraphs 8–9; Böhm-Bawerk, Positive Theorie des Capitales, II., i., pp. 96–97; Einige strittige Fragen der Capitalstheorie, i., 2, pp. 11–13. (Böhm-Bawerk does not reduce capital to past labor exclusively. He indicates very well that into the constitution of capital there enters still another element, the element of nature.)

2. If one wishes to speculate on capital, one must include a productive process which is complete from a technical point of view, or else limit one's self to a fragment of such a process which from the economic point of view will form a complete whole, as was the case with our cultivating enterprise above; but then, in order to define capital, one must not go beyond this fragment. Submitting, then, to this condition, one can measure the quantity of capital by the sum of the intermediary products which intervene, in one way or another, in the productive process; in other words, by the sum of the intermediary products which are created or bought from the beginning of the process until the acquisition of the fruits. But as one will observe that the acquisition of the fruit is always separated by an interval of time, however small it may be, from the productive operations which have prepared it, that there is not, strictly speaking, any productive act which gives its product instantaneously, and that thus every operation of production may, and must, be regarded as giving rise at the start to intermediary products, then one will be persuaded that, wishing to measure the capital as I have just indicated, we shall arrive at making it equal to the sum of the outlays of production or of the advances. The ratio of the capital to the other productive agents will be the same as if the capital were identified with the advances, and this relation will always be a ratio of one.[1]

3. One may establish the ratio of capital to the other productive agents by classifying under the first rubric those intermediary products only which are employed in the very last stage of the productive process. For example, in a forest exploitation the capital will be measured by the amount of the expenses of planting, etc.; in short,

[1] I shall have occasion to come back to this subject; for I shall have to speak of the conception which identifies capital with the "advances."

of all the expenses which are anterior to the cutting. This conception is, it seems to me, the one which is suggested to us rather than the others when we are told that capital is past labor collaborating with present labor. It seems to me to challenge very serious criticism.

In the first place, is it possible to establish a demarcation between this last stage of the productive process which we must isolate and the others, or, again, to speak as certain authors do, between present labor and past labor? Shall we not be led, when we examine things carefully, to reduce the last stage of production, the present labor, to nothing? A workman, to finish the manufacture of an object, takes ten days, and in his labor, if he has the help of instruments, he employs materials which, altogether, have cost ten days' labor. Can one say that the manufacture of the object in question has required a capital of the value of ten days' labor? Why should not one consider as "present" labor only the labor of the last day, which would make the value of capital employed equal to nineteen days of labor? Why should not one confine one's self to only the work of the last hour, of the last second, of the last instant? It seems that this is what we should do. And in this way, once more, the measure of the intermediary products will be found to coincide with that of the productive advances.

Let us admit that it is legitimate not to reduce present labor to the labor of the last instant. Let us do like those authors who, isolating at the end of the productive process a stage of a certain duration, regard this last stage as being in no respect capitalistic. Then, with the manner of measuring capital which I have indicated, we shall arrive at strange results. Here is a production in which one thousand units of manual labor are expended ten years before the obtaining of the product. Here is another

production, in which one thousand units of manual labor are expended one month before the obtaining of the product, and in which it would take five units of manual labor to finish the product. The first production, under the conception of capital we are here considering, would not be more capitalistic than the second. This example suffices, I think, to show that a measure of capital like that which is occupying us departs from what is permitted by usage. And it will also be granted, I am sure,—what is still more important,—that it could not have any scientific utility.

I come now to that second conception of capital which makes capital consist in the advances which are made for production. Undertaking certain productive enterprises, I am compelled to advance a certain sum. This sum which I advance—and which I hope to recover, after a certain time, increased by a surplus—is, as is currently said, the capital which I place or invest in these operations which I am undertaking.[1]

Capital, according to the new definition which we have decided upon, is property, seen from the point of view of its value,—property which might be consumed, which might be employed to procure an immediate or almost immediate satisfaction, and of which we make such a use that we shall recover it or have its product only after the expiration of more or less time. Let us see, then, since that is

[1] The definition of capital which is indicated here is the same one that I have adopted in my Intérêt du capital (see paragraphs 3–7) and in my Manuel d'économique (paragraph 86). It was a thorough study which I have recently made of the returns of productive agents which revealed to me the necessity of correcting it, or rather of completing it. (I shall note, in passing, that our second definition of capital, in so far as it is distinguished from the first, is scientifically very much superior to it. It makes capital something correlative to what may be called capitalisation, and it also connects the notion of capital with that of interest. It invites us to examine why capitalisation encounters obstacles, why capital obtains interest, etc.)

what interests us, what relations this definition establishes between capital and the other productive agents. Capital here is the productive advances. But in production—we have already seen—all outlays are advances. A landed proprietor putting his land under cultivation expends land. He also expends manual labor. Neither expense will give its product until later. Our land-owner, then, renounces for a time the value which he would get from his land, if, for example, he enjoyed it as a country seat; he renounces for a time the value of the manual labor which he employs; and doing this he employs capital. Capital, in short, is the expenses of production, whatever they may be, in so far as these expenses are not immediately, instantaneously productive. And thus, if you wish, capital is quite *essentially* distinct from the other productive agents, from land and labor. It is, again, if you like, that land and labor considered from a special point of view. But *quantitatively* it is not distinct from land and labor. It has no measure of its own. It will then be impossible to speak of variations of capital with relation to the other productive agents, to speak of returns, of a variable productivity of capital.

We are thus led to consider a third concept, which will be the preceding concept completed by a new element. This third concept is that of the expenses of production in so far as they constitute advances, *and as these advances are made for a certain period.* With this concept we are in the presence of a productive agent, if one may be permitted the expression, which not only is essentially distinct from the others, but which is also distinct from them quantitatively,—of a productive agent which has its own measure, and which in that way may and must be regarded as being added to the others. The obtaining of a certain

product, for example, will require an expense—in land and labor—of 10,000 francs. These 10,000 francs will have been advanced during an average period, say, of six months, or of a year, or of two years, and this average period of waiting for the product will be, in the production, something which will have to be taken into consideration.

How shall we designate the new concept which we have formed? Here we find ourselves confronted by a serious difficulty of vocabulary. Jevons proposes, when a pound is invested in a production for five years, that one speak of five pound-years, and, as a general expression, he employs that of "amount of investment of capital." He wishes to have a distinction drawn between the amount of investment of capital and the amount of capital invested, the former being equal to the latter multiplied by the duration of the investment.[1] But I shall call attention to the fact that the correspondence of the two expressions does not convey the relation of the two concepts. And especially it seems to me necessary to express the first concept by a single word, seeing the prime importance which it has for economic science.

What word shall we choose? The usage of language, it cannot be denied, dissuades us from using the word "capital." In current language, as Jevons has plainly felt, capital is advances considered from the point of view of their amount, and not at all from the point of view of the period for which they are made. On the other hand, however, economic theory assigns to capital a special rôle in production, and it is not possible to assign it this special rôle, we have seen, unless by the word "capital" we understand the expenses of production. inasmuch as they are made a determinate time before the obtaining of the product.

[1] Theory of Political Economy, chap. 7. (See Quantitative Notions concerning Capital.)

In presence of these two contrary reasons I admit that I feel greatly embarrassed. I am inclined, however, for the moment to give the word "capital" the sense which permits us to continue to see in capital a factor of production quantitatively distinct from the others. And thus in the following pages I shall employ this word to designate the concept which occupies us at this moment. The word "advances" designating the productive expenses in so far as they are not to give their product immediately, the word "capital" will designate the result of the multiplication of the amount of the advances by the duration of their investment.

Shall we illustrate by examples the definition of capital at which we have arrived? A cultivator employs a field during a certain year for a certain production. He expends upon it so many days of manual labor. If he expends nothing else, his capital will be the value of the use of the field, it will be the value of the days' labor in so far as these values are advanced for a certain period. It will be, if you wish, 10,000 francs in so far as they are advanced on the average for six months. In reality our cultivator employs, besides the land and the manual labor, instruments. Suppose, for the sake of simplicity, that these instruments are worn out in the year of cultivation which we are considering. These instruments will represent, with relation to him, along with the land and labor, a new factor of the production. And if they cost 3,000 francs, if they last eight months on the average, the capital of our cultivator will be increased by 3,000 francs $\times$ 8 months. Now, if we assume the social point of view, and wish to include the total of the productive operations which lead to the harvest, the instruments of which we have just spoken will cease to represent a distinct agent in production. They will be replaced by the land, by the labor which have enabled them to be created, and,

moreover, by capital, this capital corresponding to the value of the land and labor in question multiplied by the period for which it has been advanced.

I have just shown how capital should be measured. The measure which I have just indicated, however, is only one of the measures which may be adopted. There are two measures for capital, and there are two measures for the other factors of productions. The land, the labor, can be measured physically: thus one may speak of the use of so many hectares for so much time, of so many days of manual labor. And they can be measured from the point of view of value. Similarly for capital. When I measure capital by a certain value advanced during a certain time, that is, be it understood, a somewhat physical measure; for the value does enter into my measure, but it does not enter alone. To measure capital from the point of view of value is to express it in value, and in value alone; and, in order to do that, we must put, in place of the product of the multiplication of the value advanced by the period of the advance, a sacrifice which corresponds to that product, or, better, in an economy which admits of loans, the interest which corresponds to it. If, for example, the rate of interest is 5 per cent., then the expense in capital of any one who, in a production, had advanced 50,000 francs and waited for the product an average of two years, will be 5,000 francs, considering simple interest, and a certain sum larger than 5,000 francs, considering, as we certainly must do, interest compounded.

When one speculates on the productivity of agents, is it the technical measure or the measure in terms of value that should be adopted? In such speculations one compares certain productive agents, supposed to be fixed, with other agents which are made to vary. In the column of agents supposed to be fixed, one may adopt either one of the two measures indifferently. In the other col-

umn, if one has only one agent, one can likewise adopt whichever measure one prefers. But, if one has two or more agents, then it will be absolutely necessary to employ the measure in terms of value; for this measure is the only one which for all the productive agents, whatever they may be, reposes on one same principle. It is the only one which permits of totalizations; and, in the hypothesis which we are assuming, it is the variation of the sum of the productive agents of the second column the consequences of which we are investigating. If, for example, we take on the one hand the use of so much land, and on the other we consider the application of increasing quantities of labor and capital to this fixed quantity of land, we shall have in each case to find the sum of the labor and capital, and for that we shall have to measure the labor and capital from the point of view of their value.

When one wishes to study the productivity of capital, one will consider it with respect to the total of the other expenses of production, and one will suppose it varying, while the total in question remains fixed. Thus one can adopt for capital either of the two existing measures, and the other expenses of production will have to be measured in value.

We know now how, with that definition of capital which I have proposed, capital must be measured. By this measure we shall arrive at results quite different from those which one has if one defines capital as consisting of the intermediary products or of the advances of production. Suppose two forests planted at the same time with the same expense. One is cut at the end of ten years, the other at the end of twenty years. Suppose the expense of the cutting is the same in each case. Suppose besides, for the sake of simplicity, that between the transplanting and the cutting of the trees no expense intervenes,—that

we do not take into consideration, for example, the value of the use of the land during the time which the trees are allowed to grow. In that way, with my definition, the capital will be two times as great in one case as in the other. If, on the other hand, we identify capital with the advances, it will be the same in the two cases. If it is identified with the intermediary products to which the expenses of the last productive stage are applied, it will again be the same thing.

There are, however, cases where it may seem that the three conceptions of capital which I have carefully distinguished happen to coincide, where it seems that, knowing the advances or the intermediary products employed, we know *ipso facto* the capital,—such as I have defined it,—and inversely.

Suppose a manufacturer undertaking a certain production. He advances—I assume, for the sake of simplicity, that he does it all at once—50,000 francs. At the end of six months he obtains the product awaited; and at the same time he begins again an operation exactly similar to the first. This second operation, after six months, would be followed by a third, and so forth. At any moment which we select the advances of our manufacturer—I mean those advances which he has not yet recovered—amount to 50,000 francs, and the intermediary products which he employs, it is evident, amount to the same sum. Whatever period, on the other hand, we may consider, the capital employed by our manufacturer is equal to 50,000 francs multiplied by the period in question. We can then say simply that his advances amount to 50,000 francs, or that he is employing in his enterprise 50,000 francs' worth of intermediary products; and we can also say that he is employing a capital of 50,000 francs without specifying that this capital is employed for a determined period. If we know that the advances

in circulation of our manufacturer, or the intermediary products which he employs, are, at any moment, 50,000 francs, we shall know that in a given period he employs a capital equal to the product of 50,000 francs by the period in question, and inversely.

The remark which I just have made would hold good also for all those productions which may be called perpetual,—I mean for all those operations which do not cease with the obtaining of a certain product, but which are continued and renewed; at least, when these operations are regular, in the sense that the advances in course of use remain constant, and that the period of the advances is fixed. And one can also, without departing far from the truth, apply this remark to the economy of society; for in society, taking things as a whole, production offers, from the point of view both of the amount of the advances in course of use or of the intermediary products employed, as of the period of waiting for the products, that regularity of which I have just spoken.

It is important, however, to see clearly the meaning of the preceding remark. And first, it must be understood, this remark does not apply to a certain sort, or to certain sorts, of productive processes which would be—at least from the economic point of view—complete productive processes. What I have had in mind here is *sections* from perpetual productions or from complexes of production. Now, if one wishes to study the rôle of capital in production, it must be considered in economically complete productive processes.

But this is not all. In the hypotheses which I have indicated we know the amount of capital employed in a given period by the amount of advances in course of use, or of the intermediary products used *at a given moment* and inversely. We do not know the amount of the capi-

tal employed in a given period by the amount of the advances made or of the intermediary products used *in this same period*, nor inversely. Let us go back to the example above. Our manufacturer in one year used a capital equal to 50,000 francs × 1 year. Here is another, however, who, advancing for the first time, like the former, 50,000 francs, does not recover them till the end of a year. In a year he, too, will have used a capital which is measured by 50,000 francs × 1 year. At any moment he will have had, just like the other, 50,000 francs' worth of advances in circulation or of intermediary products. But in the year the advances will have been only 50,000 francs, whereas the other will have advanced twice 50,000 francs; and the same difference will exist as far as the intermediary products are concerned. Now, in order to speak of a correspondence between the three conceptions of capital which I have distinguished, it is absolutely necessary, since one of the three notions relates to a certain period of time, that the other two relate to this same period, and not to one instant.

Shall we show now that, if other authors have not defined capital as I have done, they have acknowledged sometimes in a more or less implicit manner, and have felt more or less obscurely, that this was the definition which imposed itself?

When Ricardo applies himself to demonstrating that the value of any good depends, not only on the labor which has been expended to produce it, but also on the time which elapses before it can be sold,[1] does he not invite us to conceive capital, in so far as it must be distinct from labor. in the manner which I have proposed?

Jevons identifies capital with what I have called advances. But we have seen that, beside the notion of

[1] Principles, chap. 1, § 4.

"capital," he soon places that of "investment of capital." And it is this second notion which at once, in his theory, becomes the more important. He will examine, for example, how the product varies, when, the expenses of production remaining the same, and consequently the "capital," the period of waiting varies; that is to say, the "investment of capital." He will tell us that, when the productive process is lengthened, the rate of interest is determined by the relation between the increase of the "investment of capital" on the one hand, and, on the other hand, the surplus of product obtained.[1]

Böhm-Bawerk maintains that the relative quantity of capital employed in production is proportional to the period of production; and that permits him, when he wishes to trace a scheme of the productivity of capital, to substitute for the notion of capital—of that capital which he has defined as consisting of the intermediary products employed by the production—that of the period of the productive process. We shall see how he justifies this substitution. But it is permissible to suppose that he was led to make it partly by an intuition which he had of the manner in which capital must be defined in the theory of production.

Marshall understands by "capital" all the property, except land, which give a revenue.[2] That is quite a classic definition. He teaches us that capital is the result of labor, combined with abstinence or "waiting." But he cannot help, after that, introducing the consideration of the period of this waiting. He will tell us, for example, that, when labor is replaced by capital, in reality it is labor accompanied by little waiting which is being replaced by labor accompanied by much waiting.[3] And

[1] Theory of Political Economy, chap. 7 (General Expression for the Rate of Interest).

[2] Principles, II., 4, § 5.

[3] VI., 1, paragraph 9; VI., 2, paragraph 9 (pp. 523, 540–541).

better still. In a certain passage[1] Marshall tells us what we must understand by those doses of labor and capital of which it is always a question in the theories on the diminishing returns of agriculture. To estimate these doses, it is necessary to add to the cost of the manual labor expended the interest on the advances.[2] What does that mean, except that capital, in so far as distinct from labor, is the very value of the labor considered at the same time in its amount and from the point of view of the period for which it is advanced?

We must not be surprised that these authors have not defined capital as I have felt bound to do. Nor must we be surprised that several of them have shown that they felt inclined to arrive at the definition which I have proposed. They have been prevented from adopting this definition by the usage of the several languages, which makes capital consist of property or of a value, and not of the product of the multiplication of the value by a period. But, on the other hand, as Marshall has well said, the word "capital," scientifically, has its most important use "in the inquiry how the three agents of production, land, labor, and capital, contribute to producing the national income, and how that income is distributed among the three agents."[3] Now capital, we have seen, cannot figure in the theory of production as a really distinct agent unless it is defined as I have defined it. In the theory of distribution, on the other hand, the concept of capital is correlative to that of interest. Now it is sufficiently well known that interest is proportionate to what I would call capital; that is to say, to advances considered both in their amounts and in their period.

[1] IV., 3, paragraph 8 (p. 171).

[2] The interest of the capital employed, says Marshall; but, saying this, he is using the word "capital," in the same sentence, in two different senses.

[3] Principles, II., 4, paragraph 5 (p. 78).

2. *Capital and the Period of the Productive Process.*

What relation is there between capital and the duration of the productive process? I shall be very brief on this question, which is already settled, at least implicitly, in the preceding pages.

In a production an *absolute* increase of capital may be accompanied by an abridgment of the productive process. Take, for example, a cultivation for which 2,000 francs are spent one year before the harvest, 2,000 francs six months before the harvest, and 2,000 francs at the time of the harvest. Suppose that to these cultivating operations a new one were added, which takes place three months before the harvest, and which necessitates a supplementary expense of 2,000 francs. The quantity of capital will be found to be increased by 2,000 francs × 3 months. And at the same time the average period of waiting will have diminished. It was originally six months since $\frac{2{,}000 \times 12 + 2{,}000 \times 6 + 2{,}000 \times 0}{6{,}000} = 6$. It will now be only 5¼ months, since $\frac{2{,}000 \times 12 + 2{,}000 \times 6 + 2{,}000 \times 3 + 2{,}000 \times 0}{8{,}000} = 5.25$.

But, if an absolute increase of the capital may be accompanied by a diminution of the period of the productive process, so a *relative* increase of capital will necessarily correspond to a lengthening of the productive process, and inversely. Likewise, a relative diminution of the capital and an abridgment of the productive process can never exist independently. In the case indicated above the productive process was abridged, and at the same time the relative importance of the capital was diminished, since the relation of the capital to the productive expenses shifted from $\frac{2{,}000 \times 12 + 2{,}000 \times 6 + 2{,}000 \times 0}{6{,}000}$ to $\frac{2{,}000 \times 12 + 2{,}000 \times 6 + 2{,}000 \times 3 + 2{,}000 \times 0}{8{,}000}$; that is, from 6 to 5.25.

It must be understood that, when I speak of relative capital, I consider capital, as I have already said we should do, in its relation with the totality of the other expenses of production, and with nothing else. Let us return to the same example. If we wish to make capital relative to the surface of land cultivated, then the absolute increase of the capital would also be a relative increase.

On the other hand, it will have been noticed that the numbers which indicate the relative size of the capital in the operations we are considering, are exactly the same as those which indicate the period of the productive processes. This signifies that the relative size of the capital is nothing else than the very period of the productive process. And, in fact, if we call a in a production the amount of the advances made, and call t the average time of waiting for the product, the capital will be equal to $a \times t$. And it is immediately evident that $\frac{a \times t}{t} = a$.

Then, if we call *capitalistic degree* of a production the *relative* size of the capital in this production,—and that is what the expression ought to signify,—this capitalistic degree will depend on the period of the productive process, since we have just seen that the relative size of the capital depends upon it.

Under the definitions of capital which depart from that which I have adopted, the correspondence is lost between the relative size of the capital, or the capitalistic degree of production, and the period of the latter. If we identify capital with the productive advances, then, whatever be the period of the productive process, the relative size of the capital will remain the same, or, better, there will be no relative size of the capital. If capital is identified with the intermediary products, then either it will be as stated above or else—supposing we measure the intermediary products in a certain way which we have seen—we shall

have different results, but results which will not assure the correspondence I have spoken of. Suppose a production in which 10,000 francs are expended a year in advance, and 10,000 immediately before the obtaining of the product. Suppose, on the other hand, another production in which 10,000 francs are expended six months in advance, and 10,000 immediately before the product is obtained. The period of the productive process is longer in the first production. And yet, the quantity of intermediary products would be the same in the first case as in the second, and the quantity of capital, so measured, would be the same.

Böhm-Bawerk, who makes capital consist in the intermediary products, has himself asserted, however, that a production is all the more capitalistic, in other words, that the proportion of capital employed in it is all the greater, when the waiting for the product, that is, the average interval between the expenses of production and the obtaining of the product, is longer.[1] This proposition appears evident to Böhm-Bawerk. It is for him "of axiomatic clearness."[2] Nevertheless, he takes the trouble to justify it.[3] A people, he says, has at its disposal, in a given space of time, a certain quantity of "original productive forces."[4] Since capital, then, consists of "past labor" and of productive forces of nature which have been, so to speak, stored up, then the longer the average duration of the productive processes, the greater the quantity of capital which collaborates, in each period, with the original productive forces of that period. If

[1] Positive Theorie, p. 94; see also the Positive Theory of Capital and its Critics (Quarterly Journal of Economics, vol. x. pp. 121–133) and Einige strittige Fragen der Capitalstheorie, i., 2.

[2] Einige Fragen, p. 11.

[3] See Positive Theorie, pp. 96, ff.; Einige Fragen, pp. 11–13; see also the article in the Quarterly Journal of Economics already quoted.

[4] Originäre Produktivkräfte: they are Arbeitsleistungen and Bodensleistungen (Positive Theorie, pp. 96–97).

from a given port there starts, for a certain destination, one boat an hour, the length of the voyage will determine the number of boats on the way at any moment.[1]

It must be carefully observed how Böhm-Bawerk reasons. He considers a cross-section of a perpetual and regular production, and this capital—that is, these intermediary products—which he measures, is the intermediary products employed at a given moment. In this way his reasoning is just. We have seen the fact that in a regular production the quantity of the intermediary products employed at a given moment corresponds to the capital—in the sense which I have given that word—employed in any period which one may care to consider. If, then, the relation of the capital employed in a period to the productive expenses of the same period gives us the average duration of the production, the relation of the intermediary products employed at a given moment with the productive expenses of a period will also give us that duration. But if we leave the special hypothesis which Böhm-Bawerk has assumed, if we cease to measure the intermediary products at a given moment, his thesis on the relation between the capitalistic degree of production to the duration of the production, *in the manner in which he defines capital*, will cease to be just.

Böhm-Bawerk, in short, defines capital without letting the notion of duration enter into his definition, after which he tries to establish a certain relation between the notion of capital employed in production and that of the duration of production. But this undertaking is vain. The relation in question will not be verified—at least in a universal manner—unless one has introduced the notion of duration into the very definition of capital.

[1] One may find something analogous to what Böhm-Bawerk says—analogous, but not identical—in Marx. See Le Capital, liv. ii., chap. 15.

3. *The Productivity of Capital.*

We come at last, after long preparation, to the question which I purposed to treat. This question, it must be remembered, is that of the variations which take place, in the product obtained for each unit of expense,[1] when the relative size of the capital varies. It is that, in other words, of the manner in which the product varies, when the duration of the productive process is lengthened.

Böhm-Bawerk is the first who fixed his attention[2] on this question. Let us see, then, how he solves it.

In Böhm-Bawerk's opinion, when in production one uses roundabout methods, which do not give immediately the product that one wishes to have, one has, if these methods are well chosen, more products for each unit of expense.[3] And the longer one consents to await the product, the more product one will have per unit of expense. With the lengthening of the productive process, if one chooses the productive methods well, the product per unit of expense will increase indefinitely, altho it must increase less and less quickly.[4] If a month of

[1] I leave out of consideration, in the estimate of expenses, that expense which is represented by the use of capital as such.

[2] We already find, however, a hint in Jevons. "Every new machine, or other great invention," writes Jevons (Theory of Political Economy, chap. 7, General Expression for the Rate of Interest, 1st ed., p. 238), "will usually require the fixation of capital for a certain average time, and may be capable of paying interest upon it; but, when this average time is reached, it fails to afford a return for more prolonged investments." This hint of Jevons, which he gives incidentally, does not agree, as will be seen, with what Böhm-Bawerk teaches.

Jevons also writes, in the same passage (pp. 236–237): "Let the time [the time elapsing between the expenditure of labor and the enjoyment of the result] be t, and the produce for the same amount of labor i, which may be supposed always to increase with t. . . ." But here Jevons is examining a certain problem, and the "always," which contradicts the thought of the passage quoted above, seems to represent only an editorial error.

[3] Positive Theorie, pp. 18, 86 (I., ii., II. 1); Einige Fragen, p. 3 (i., 1).

[4] Positive Theorie, I., i. (pp. 89–93, 97), III., iii. (p. 274); Einige Fragen i., 2 (p. 9), 8 (pp. 39–40); *cf.* the article already quoted in the Quarterly Journal of Economics.

labor, for example, gives at once 100 units product, with productive processes necessitating awaiting of one, two, three, four, five, six, seven years, we shall have respectively 200, 280, 350, 400, 440, 475, 500 units.[1] If it were decided to adopt productive processes of a duration of eighteen centuries, we should obtain products "high as mountains."[2]

This view of Böhm-Bawerk's has been criticised. But more than once it has been criticised without being well understood.[3] I intend to mention here only the observations of those authors who have grasped Böhm-Bawerk's thought.

Bortkiewicz declares that for reasons of a physical order the lengthening of the productive process must have a limit. He seems, however, to hesitate about the point whether the series 100, 200, 280, 350, 400, 440, 470, 500, should be followed by zeros, or if it should be continued by repeating the number 500.[4]

Bleicher affirms that, lengthening the productive process, the product will not increase indefinitely, that there is a point where this product obtains its maximum, and after which it will diminish.[5] And such is also the opinion of Fisher. The latter begins by declaring that there is no objection to be made to the proposition of Böhm-Bawerk that the product increases with the duration of the production.[6] But he shows us soon afterward that he does not admit here an indefinite increase of the prod-

[1] Positive Theorie, p. 276.

[2] *Bergsoch.* Ibid., 277.

[3] See Einige Fragen, i., *passim.*

[4] Der Cardinalfehler der Böhm-Bawerkschen Zinstheorie, in the Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft, 1906 (see pp. 953–956).

[5] Gegenwart und Zukunft in der Wirtschaft, in the Jahrbücher für Nationalökonomie und Statistik, vol. 54 (1890), p. 347.

[6] The rate of interest, IV., paragraph 3 (p. 58).

ucts. He tells us that a time will come when the product will diminish.[1]

Let us see now what reasons Böhm-Bawerk gives us to justify his thesis, what arguments he uses.

Böhm-Bawerk represents somewhere[2] that each new detour that is decided upon in a production implies recourse to a supplementary "auxiliary force," which would increase the productivity of the labor. The more detours we make, then the more product we shall obtain. But there is nothing convincing in this. Böhm-Bawerk has warned us himself[3] that the duration of the productive process does not depend upon the number of detours of production. And, even if the number of detours and the duration of the productive process should correspond, one cannot see why the product should necessarily and indefinitely increase, relatively to the productive expenses, with the multiplication of the auxiliary forces employed.[4]

Again, Böhm-Bawerk represents that, if in society the quantity of capital which each laborer employs could be increased, the production per laborer would be augmented.[5] But it is not a question of knowing whether, employing more past labor, the present laborer will produce more. It is a question of knowing whether, the present laborer employing more past labor, the product will increase relatively to the unit of labor expended; that is to say, of labor both past and present. Better still, it is a question of knowing whether the product will in-

[1] Ibid., pp. 66–67, 68–69. I may be permitted to quote myself, after the authors above mentioned, and to refer to my Intérêt du capital, paragraphs 98, 136–137, and to my Manuel d'économique, paragraph 92. In these works, however, I had not got to the point of making a finished study of the question which occupies us here.

[2] Einige Fragen, pp. 10–11 (i., 2). [3] Positive Theorie, p. 96.

[4] In truth, the passage from Böhm-Bawerk which I have just quoted tends less to demonstrate the thesis which is occupying us than to render it probable.

[5] Einige Fragen, p. 11. In the article, The Positive Theory of Capital and its Critics, Böhm-Bawerk considers no longer social production, but a special branch of production.

crease, in the relative manner which I have just indicated, indefinitely. And thus the argument of Böhm-Bawerk loses its force.

What is left, then, to support Böhm-Bawerk's thesis? A certain number of examples with which he illustrates it.[1] There is the example of the man who needs water from a spring distant from his home, and who, instead of going to drink at the spring each time he is thirsty, makes himself a bucket, then arranges a pipe system; there is the example of the man who, after having fished with a line, manufactures a net and constructs a boat; that of the man who wants to lay in a stock of wood, and who, instead of breaking branches with his hands, decides first to manufacture an axe, etc. These few examples, according to Böhm-Bawerk, suffice to establish the universality of the thesis which he sustains. They are typical examples,[2] each of which represents an indefinite quantity of similar or analogous cases, and thus any one who will consider them attentively is to be persuaded of the truth of Böhm-Bawerk's thesis. Take an article the production of which is already highly capitalistic, and can be decomposed into a large number of stages. There will not be one of these stages in which the capitalistic character of the production cannot be accentuated in a technically advantageous manner by the introduction of some new machine, by the introduction of more elaborate and more durable instruments, etc.[3]

So reasons Böhm-Bawerk. For my part, I do not see that these examples which he gives us, or suggests to us, prove the universality of his thesis. The universal proposition which might be proved by typical examples is the following: with greater advances, I can increase in-

[1] These examples, scattered through the Positive Theoris, have been collected by Böhm-Bawerk in Einige Fragen, p. 9 (i., 2).

[2] Einige Fragen, p. 10.

[3] Ibid., pp. 39–40 (i., 8).

definitely the *absolute* quantity of the product; but this proposition is quite different from that of Böhm-Bawerk. Böhm-Bawerk's proposition is that, with a greater *relative* quantity of capital, one can always obtain a greater number of products for each *unit of expense*. Let us consider a complete productive process. By replacing in one of the stages of this process manual labor by a machine, by replacing certain machines by more elaborate and durable machines, and this in such a way that our productive process employs more capital, I shall always be able to have more products. But shall I always be able to have more products by increasing the relative size of the capital; in other words, by lengthening the duration of the productive process? Nothing so far assures me of it. And, even if it were so, it would still be necessary to prove that, being able to increase the absolute quantity of the product by the lengthening of the productive process, I can at the same time increase the product obtained per unit of expense.

In short, what it is a question of proving is that, if

x land and labor with y capital gives P product,

then

x land and labor with ay capital gives P' product,

or more than p.

Now Böhm-Bawerk's examples show us that, if

x land and labor with y capital gives P product,

then

$a'x$ land and labor with ay capital gives P' product,

a' in this formula being possibly greater than $\frac{P'}{P}$, and

greater also than a.

Böhm-Bawerk has failed to prove his thesis. What are we to think of it? We must consider it false. Ac-

cording to Böhm-Bawerk, the same quantity of expense, if the productive process is lengthened, will give indefinitely increasing products, but products which in truth would increase less and less quickly. In reality, the product per unit of expense will increase at first, to decrease afterward. According to Böhm-Bawerk, 100 units of expense, according as one adopts productive processes of a duration of 1, 2, 3, 4, 5, 6, 7 units of time, will give 200, 280, 350, 400, 440, 475, 500 units of product. In reality, they will give a series something like 200, 280, 350, 240, 160, 80, 40 units of product. All the examples furnished by reality, it seems to me, prove that this is the case.

Here is a forest being planted. Supposing that you wait, to cut the trees, a longer or shorter period of time. The quantity of wood we shall have will keep increasing at first, and remain stationary afterward. Thus, if there were no other expenses than that of planting and that of cutting, we should have for the return of these expenses a curve which would rise at first, with the lengthening of the waiting, and would then change to a horizontal. If we take into consideration that expense which is represented by the value of the use of the land during the time which the wood is allowed to grow, our curve will then have, after an ascending branch, a descending branch.

I intend to cultivate a piece of land. I am going to increase my expenses of cultivation indefinitely and in such a way that the duration of the waiting always increases. Will the product per unit of expense increase indefinitely? Not at all. A time will come even when the supplementary expenses which I shall undertake will no longer increase the product by a quantity equal to their amount. I have a manufacturing enterprise. I increase the capitalistic character of it by introducing new machines, by replacing the buildings and machines

in use by solider and better constructed buildings and machines. If I continue in this course, I shall arrive after a certain time at expenses the value of which will not be recovered in the product.

In short, if we grant that

x land and labor with y capital gives p product,

then, increasing the relative quantity of the capital, it may happen that

x land and labor with ay capital will give p' product, or more than p.

But for a certain relative size of y it will happen that

x land and labor with ay capital will give p'' product, or less than p.

From what I have established regarding the productivity of capital, there is more than one consequence to be drawn. One might draw from it, for example, an argument against the rôle which Böhm-Bawerk attributes to the productivity of capital in the formation of interest, if the views of Böhm-Bawerk on this question did not already in other ways invite criticisms which, to my mind, are decisive.[1] And here is another consequence. If the accentuation of the capitalistic character of production is bound to have the effect, beginning at a certain point, of diminishing the product obtained per unit of advances, then we shall doubtless have to conceive the increase of the relative quantity of capital as bound to tend towards lowering the rate of interest sooner than it would if the scheme of the productivity of capital which Böhm-Bawerk gives us were exact.

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[1] See my Intérêt du capital, paragraphs 96–104.

PROPORTIONS OF FACTORS—ADVANTAGE AND SIZE.

SUMMARY.

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Is it possible to distinguish between the Law of Diminishing Return and the Law of Increasing Return? Do these laws formulate separate aspects of phenomena or apply to separate fields of subject-matter? Has the one, for example, to do only with agriculture, while the other applies exclusively to manufacture? Or is one merely the obverse of the other, as laws expressing respectively the outcome of the skilful or of the unskilful adjustment to any given set of conditions? And are there, in the sense of the ordinary formulations and interpretations, any such laws? Or have we rather to do with two other laws,—the first, the Law of Proportion of Factors, as over against the second, the Law of Advantage and Size? To the solution of these questions and of several associated questions some contribution will be attempted in this paper.

In its most general statement the Law of Proportion of Factors formulates the disadvantage accruing from any defect in the relative proportions of the factors of production. It is a law of disadvantage from bad combination.

It is a most difficult matter—as the history of doctrine fully illustrates—to preserve the distinction between the social and the competitive aspects of this Law of Proportions, and at the same time to preserve the distinction between the static and the dynamic aspects of the same law.

The Social-static Formulation.

It is evident that society may be badly circumstanced by virtue either of a scant aggregate equipment of productive instruments, relatively to the number of laborers, or of an equipment relatively scant in particular directions. And it is equally clear that the situation may be a fortunate one—for such members of society as there are—by the fact that the membership is a small one relatively to the supplies of land and other instrumental goods. If the per capita equipment in lands or appliances is generous, the society, taken as an aggregate is so far fortunate,—the average level of comfort is a higher level.

The transition from the static to the dynamic aspect is easily made,—is indeed almost inevitable. Whatever is dynamic leads merely to a new application of static doctrine. That is to say, in order to appraise the significance of the dynamic, there is always necessary another appeal to the static: only so is appraisal possible of the significance of the change. The dynamic aspects of any problem refer merely to the forces at work to make the situation a new and different situation. But in each new situation there is nothing new but the situa-

tion: the static doctrine is still valid; the problem in its setting of new terms remains in principle and in method of analysis the same problem.

The Social-dynamic Formulation.

Society is advantaged by every change making for a more generous aggregate equipment of productive instruments relatively to the number of laborers or making for an equipment relatively more generous in any particular direction. The social significance of this Law of Proportions is, therefore, mainly to be sought in the field of history or of prophecy. What bearing on the aggregate social welfare have changes in the relative supplies of productive factors?

To illustrate: The Black Death in England may be taken to have swept away one-half of the population of England, leaving, however, unimpaired the supply of land and of other productive equipment. It thereby became possible for the remaining population to enjoy the advantages of a better per capita equipment of land and appliances. Conditions were favorable to the resultfulness of human effort. Doubtless there were also changes in the terms of the distribution of this product among the different co-operating factors; but with the purely distributive and competitive and individual aspects of the case this social formulation of the Law of Proportions is not concerned.

And so, again, were the present population of the world to be doubled, all other things remaining the same, the per capita product of industry must suffer.

Likewise, also, if a population remaining unchanged in point of numbers were to acquire a double per capita labor effectiveness, whether by improved technique or by development in strength, or in intelligence, or in in-

tensity of effort, the social product would not thereby be doubled unless, together with this, there should take place a proportionate change in the supply of land and of other equipment. And all this means merely that if some, but not all, of the productive factors are doubled, the product will not fully double.

It is clear that this social-dynamic aspect of the law in question was that phase with which alone Malthus was logically concerned in his formulation of the social menace of population tendencies. For the purposes of Malthus' argument nothing need have been deduced as to the bearing of expanding population upon land rents. Nothing was necessarily inferred as to the trend of wages relatively to the other distributive shares, neither private ownership in land nor private ownership in any of the productive equipment necessarily assumed. The formulation was equally valid for the collectivist or for the competitive society. The investigation bore solely upon the ratio of product to the per capita of population,—on the rewards of industry as over against the pain-costs or the time-costs. The product was regarded in the weight-and-tale aspect, or, at most, as reduced to some sort of utility denominator for average or social purposes. No suggestion of the competitive or of the market-value calculus was pertinent to the problem.

The Competitive Formulation.

But in a society competitively organized the private and competitive value aspects of the Law of Proportions press insistently for hearing. In its most general and inclusive statement the competitive law runs in substantial parallel with the general social law: *Disadvantage accrues to the individual from any excess or defect in the relative proportions of his factors of production.* This

is the competitive and individual aspect of the law of the bad combination of factors.

First, however, the static aspect. The explanations for this badness of combination may be various. In one way or another the entrepreneur has unskilfully gone about his undertaking,—has attempted to get on with too much or too little land,—has over-supplied or under-supplied himself with machinery or with seed or with fertilizers,—has hired too few or too many laborers or laborers of the wrong sorts or grades,—or has not correctly proportioned the different grades to one another.

But, even so, this static formulation has two important aspects,—aspects only with great difficulty distinguished,—aspects which, in fact, have never, in the history of the science, been consistently distinguished, but which none the less make imperative demand for careful and consistent distinction: (1) The law may refer to purely technological considerations,—to the fact, *e.g.*, that in market gardening or in grain production there must be seed to go with the land, or that labor must stand in some sort of proportion to machinery, no matter how high the wage or how cheap the machinery; (2) but, for ordinary competitive purposes, it is evident that a wise combination of factors must depend mainly upon the relative hires or costs at which these factors are to be had. This follows from the fact that all competitive entrepreneur computations, both of cost and of product, run in terms of value outlay as over against value product. No one combination of factors, therefore, can be asserted to be the best for purposes of the entrepreneur, and to be diverged from only with disadvantage, unless upon the assumption of an established relation of prices among the various factors employed. With each change in relative prices a new combination comes to be the best combination. It is, in fact, only by this dependence

of the amount of the employed factor upon the value of that factor that the constant redistributions and substitutions of factors become possible. If wages are high, the pressure is strong toward the introduction of machinery. In countries of low wages, machinery is little called for. If land commands high rent, it pays to increase the proportions of labor or of fertilizers or of implements.

But it is none the less true that there is all the while in the background a technological basis for this Law of Proportions. Substitutions and redistributions of factors are, no doubt, constantly taking place with every change in the relative prices of factors. But were these substitutions possible of indefinite extension, if machinery costs could be fully and entirely substituted for labor costs, if additional labor could avail fully to atone for the shortage of land, if machines did not require attendance and if horses did not need drivers, there could never set in any relative shortage of factors, and no disadvantage could ever attach to any possible proportionment of the different productive factors. Were it, for example, always and without disadvantage possible to increase the labor investment upon any given piece of land, no land shortage could ever manifest itself, and rent must disappear. If outlays for more machinery or for more expensive machinery could go on indefinitely without the call for more labor, together with the machinery,—if, that is to say, machine expenses could fully and everywhere take the place of labor expenses,—developing invention would finally deprive labor of all employment.

Value, that is to say, exists only as dependent upon some degree of scarcity. If, in agriculture, increased expenditures for non-land factors of production were not attended with constantly falling compensations both in volume and in value, no land scarcity could

exist and no land value result. So, if labor expense could be indefinitely applied to one mowing-machine or to one horse-rake, without disadvantage in the ratio of results to expense, mowing-machines or horse-rakes would mostly fail of a market. If one pound of phosphate would suffice to fertilize a continent, phosphate would be safe from ever becoming dear in price. Thus by this very fact that substitution is not indefinitely possible, it comes about that too little or too much of any productive factor gives bad results. And this is true in the value aspect precisely because it is true in the purely weight-and-tale and technological aspect. Precisely because entrepreneurs are different, is there never, at one and the same level of factor costs, any one best combination of factors for all entrepreneurs. This is constantly illustrated and attested in actual farming. One farmer rents more land or better land, and thus, through the larger rent outlay, excuses himself from what would be for him less advantageous outlays for machinery or fertilizers or labor. Another farmer finds it to his advantage to restrict himself in rent outlays and to extend his investment in the direction of machinery or fertilizers or labor.

But, let it be repeated, that the principle of substitution holds at each entrepreneur margin does not prove that the principle of substitution is indefinitely applicable at no matter how distant removes from the margin of substitution; for otherwise there would be nowhere any disadvantage from an increase of expense upon a fixed supply of land, or any loss from twenty laborers working at one loom, or, for that matter, any reason why indefinite wagons should not dispense with the need of horses and drivers.

It is, however, clear, that in the main the technological relation between the different production goods

is one of complementarity and interdependence rather than of the infinite possibility of substitution. More men with more machines may call for more land rather than for less or for the old land at a higher rate of rental. Machinery does not displace men indefinitely, but, under stable conditions of technique, calls instead for men to fashion or to tend. Wagons furnish a demand for drivers, ships for sailors, horses for drivers, drivers for wagons, and so on without limit.

But it is now necessary to note that in all this there is no warrant for the threefold or fourfold division of productive factors, since it is equally clear that bricklayers furnish a demand for hod-carriers, carpenters for masons, wagons for horses, sailors for cooks, engines for cars, cars and engines for coal, rails for ties, meadow land for pasture, and both for timber land, and so on indefinitely. So an increase in artisan skill may intensify the demand for some machinery the while that it displaces other. So, also, enlarged supplies of some grades of labor furnish a demand for other grades of labor; *e.g.*, carpenters for architects and masons, spinners for weavers. Again, some machinery creates a demand, not for land as complementary good, and not, in any appreciable degree, for labor, but for other machinery. In the history of English industry the spinning jenny placed an immense premium upon the invention of the power loom, and both called shrilly not for more men, but for the introduction of power machinery. New coal lands would injure the wood lots and benefit the iron mines. New fisheries would probably lower the income from pasture land, and perhaps intensify the demand for cereal lands.

The truth is that all of these relations—on the one hand, of complementarity, on the other, of substitution—depend upon the particular situation in point of tech-

nique, and have not even the remotest relation to the land-capital-labor classification. It is possible enough—it is indeed characteristic of modern life—that modifications in technique (that is to say, in the human factor of production) greatly reduce the pressure upon land. This is especially noticeable in the effect of farm machinery toward the lowering of agricultural rents taken in the aggregate. Improvements in transportation work in the same direction, and at the same time do another thing: they create accessibility. Thus, practically speaking, they create land.

But all this in no wise avails to impeach the Law of the Proportion of Factors, but applies rather to support and to emphasize it, at the same time vastly extending its scope.

But why does the point always arrive at which nothing serves as a substitute for more land,—a point, that is, at which more and more intensive cultivation gives more and more meagre returns? And, for that matter, to what quality or characteristic of machinery is it due that only so many men can work with one unit of capital goods? The answer must be shortly given and be left to approve itself. The one attribute of land which finally discourages all attempts at substitution, and assures to land its ultimate relation of complementarity, appears to be the spatial attribute,—the impossibility of compressing agricultural or building or climatic or scenic aspects of land utility into ever smaller compass and without limit of disadvantage.

With machinery as related to labor, the spatial fact seems to be sometimes important; but the complementarity more commonly traces to the recurrent necessity in all machine processes for volition and direction.

In the interests both of safety and of accuracy great

care must be taken that all competitive formulations of the Law of Proportions run consistently in value terms. For competitive purposes the following formulations are evidently wide of the point. "In agriculture . . . by increasing the labor the produce is not increased in equal degree";[1] or "The application of increased capital and labor to land will add a less than proportionate amount to the produce raised";[2] or "Additional investments of labor and capital . . . yield a proportionate increase in product";[3] or "In the extractive industries the continual investment of labor and capital on any given tract of land will . . . yield a diminishing proportionate return";[4] or "After a certain point has been passed in the cultivation of an acre of land . . . increased applications of labor and capital yield less than proportionate returns in product";[5] or "Whenever double the amount of exertion yields more than double the amount of product, we are in the presence of the Law of Increasing Returns or Decreasing Costs. When double the exertion just doubles the output, we have the Law of Constant Returns or Constant Cost";[6] or "In the case of agricultural land . . . additional doses of capital and labor will yield a relatively smaller produce."[7]

Land costs, labor costs, material costs, wage costs, and opportunity costs, all require the rendering over into the denominator of price or of entrepreneur capital, and must be set over against a total of value product before the so-called Law of Diminishing Return or any other law of return can come to be relevant to the entrepreneur computation. Land as superficies, plus labor and cap-

[1] Mill, Principles of Political Economy, Book I., chap. xii., sect. 2.

[2] Marshall, Principles of Economics, 4th edition, p. 230.

[3] Bullock, Quarterly Journal of Economics, xvi., p. 475.

[4] Ibid., p. 480.

[5] Seager, Introduction to Economics, p. 114.

[6] Seligman, Principles of Economics, p. 250.

[7] Ibid., p. 306.

ital somehow aggregated, cannot be compared with weight-and-tale product, and still less with value product.

Nor can any formulation be strictly to the purpose of the entrepreneur analysis, when the costs are duly aggregated into value and price totals, but are set over against mere quantity of product. Quantity of product appeals to the entrepreneur only as it may directly translate into value of product. And this truly it may often do, but only on condition that the product of the enterprise is a relatively small one and the competitors many. But in any case the competitive law must be made exclusively a value law, either in terms or by interpretation.

But what now is the significance of the Law of Proportions taken in the competitive and in the purely static sense? Does the law in any sense throw light on the determination of prices? No *social* law of return—whether static or dynamic—is relevant to the price adjustment. Nor, so far as we have yet gone with the competitive-static analysis, have we at all advanced ourselves for any purposes of the price problem. To assert that the less shrewd the entrepreneur in fixing the relative proportions of factors, the smaller will be his value product, does indeed vaguely hint of the profits accruing to him relatively to his competitors,—says in substance that here as elsewhere the unskilful man gets the worst of things, but makes no deliverance as to prices. True it is that, if entrepreneurs should become more capable in any industry, prices might thereby be affected, but this is to smuggle dynamic facts into a purely static problem.

Nor has any basis been so far offered for distributive inferences, unless perhaps with this single reference to profits. We have only a greater or smaller total of value

product relatively to the total of value costs, accordingly as the productive factors have been well or ill combined. But in this there is nothing to indicate whether wages will rise or fall, whether absolutely or relatively to rent or interest,—nothing to show that rent will gain or lose in the total or in relation to any other distributive share. We have in fact arrived at nothing better than an entirely obvious conclusion as to the profits of entrepreneurs relatively to one another.

But, so far as the Competitive-static Law is valid and serviceable,—and for whatever purposes it is valid and serviceable,—it is obviously a law equally applicable to all the co-operating productive factors. It is not in any especial degree a law of agricultural production; nor is it a law valid only by virtue of the presence and the use of land and in the degree solely of this presence and use.

Where, then, shall warrant be found for the doctrine—purely as a static formulation—that, if land is relatively scarce, land rent must be high relatively to other costs? Or that, if laborers become scarce, their wages are likely to rise? Or that a scarce loan fund means high interest rates, other things remaining the same? Or that machine rents are commonly high if the particular kind of machine is difficult—costly—to obtain?

Doubtless all these propositions are valid; but for these particular and specific laws neither formulation nor justification has yet been given. And more than this,—the distributive analysis necessary to justify any one of these formulations is an analysis both difficult and delicate. All this, however, will become clearer in our examination of the Law of Proportions in its fourth and last aspect, the competitive-dynamic.

The Competitive-dynamic Formulation.

Here, again, the step from the static to the dynamic is so ready of making as to be almost inevitable. Whatever is true for the analysis of the static situation before the dynamic influences have come to apply will *in doctrine and method* hold for the analysis of the situation in its new setting. For a full treatment of the dynamic aspects of our problem we should therefore have to inquire: (1) as to the influences resulting in changes in the relative supplies of particular factors, or in the relative demands for products, or in the technological relations between the various productive factors; (2) as to the bearing of these changes (*a*) upon the total of the entrepreneur's value product relative to his value costs; (*b*) upon the relative changes in his outlays for the various cost factors,—that is to say, upon the terms of the distribution of his value product. For costs to the entrepreneur are distributive shares to the recipients.

(1) Nothing worth while can be offered here in explanation of the various aspects of change in the human factors in the economic situation, either (*a*) on the demand side, in numbers, in needs, and in desires, absolutely and relatively; or (*b*) in the aspect of productive agent,—in health, strength, endurance, industry, moral qualities, or in social and economic institutions; or (*c*) as bearing on productive equipment,—in abstemiousness, in the expansion of credit relations, in the extension of transportation activities, and, in general, in the progressive development of the science and technique of industry. Nor can more or better be done in rendering account of the changes in supplies of industrial equipment,—the subjugation of new fields, the opening up of new continents.

Nothing, indeed, is here both practicable of doing and

worth while doing further than shortly to note the bearing of relative increases in the supplies of productive factors upon the values of the products especially due to them, and upon the relative distributive shares imputed to them out of the jointly produced values.

It was surely never a great or an important discovery with regard to prices that, if they change at all, they must either go up or go down. Equally safe, and of equal significance, was the corresponding deliverance with regard to costs: they will remain constant or they will rise or they will fall. There is, indeed, a question whether a scientific law can properly be anything other than a grouping of phenomena with relation to one specific causal influence,—some question, that is to say, whether a formulation asserting merely the outcome and resultant of the composition of several different co-operating influences is, in any proper sense of the word, a law at all. But, unless as coming under this objection, there can surely be no harm, and no service, in indicating by the Law of Constant Return the sheer fact that prices will turn out not to change, or in dignifying by the name Diminishing Return a trend toward rise in price, or in understanding by Increasing Return a probable or certain fall of price.

But the competitive-dynamic law of proportions may reasonably be expected to bear more desirable fruit than this. Taking it as granted that changes in the relative supplies of productive factors are to occur, an inquiry, or a series of inquiries, may certainly be projected as to the resultant trend of prices. And there is no doubt also that, as matter of detail and of process in a competitive-entrepreneur economy, this trend of things would perforce express itself as a change in relative costs. But the entrepreneur costs are themselves results of the

changing aggregate situation, and only as intermediate terms in a longer causal sequence to be regarded as causes of any sort. The ultimate determinant of the high price of any product is to be found in the scarcity of the productive factors upon which the forthcoming of the product is conditioned. Accurately, *for present purposes* it may be said that the causal sequence runs from scarcity of factors to scarcity of product, thence to the high value of the product, thence to the high pay of the factors, and thence to the high value of the factors.

No detailed discussion or analysis of the distributive process is practicable here. Enough has perhaps been said to indicate that all such laws of return as report the absolute or relative share of any value product imputed to any item or class of productive factors are rather laws summarizing the distributive outcome than indicating or reporting the play of causal forces and the direction of the causal sequence. They are not so much laws illuminating other problems as deriving illumination from other solutions. At best they merely furnish the cost-underpinning for the shaky entrepreneur-cost explanation of market value. But, even from the entrepreneur point of view, the values of the costs look as much like results of value as like causes of value.

One caution, however, is here called for. It has long been the vicious habit of economists to proceed directly from changes in the supply of productive factors to the changing values of these factors,—to assume, that is, that the analysis, valid for the price determination of consumable goods, may be safely applied to production goods. But again be it said that the causal sequence runs not directly from the supply of instruments, but first to the supply of products, then to the value of products, and, only as the last step, to the value of instruments.

The law of the falling price of a consumable good with an increasing supply of that good holds in its usual formulation only because the demand schedule with any one line of consumption goods may be taken as a fixed fact. New supplies can be marketed only on terms of such prices as shall tap lower levels of price-paying disposition. If, however, the increase is one of a productive agent, there results a new and larger volume of value product, and a rearrangement of the conditions of demand. The new level of remuneration is to be worked out only as the outcome of a new problem of distribution. There is assumed a new volume of value product to be imputed to a new and a rearranged and readjusted set of productive agents. So, then, with population increasing relatively to the other factors, there may be expected a fall in the level of wages, but this only by virtue of two influences: (1) a less than proportional increase in the product to be distributed; (2) less favorable terms of distribution for labor relatively to the other agents concerned in the technological process.

It is evident, then, that the corollaries of this Law of Proportions, taken in the dynamic and competitive sense, are many and important. The applications are far wider, far more difficult, and far more significant than a mere analysis of the bearing of all the different possible changes in the supplies of productive factors (population changes among all the rest), upon prices in general, upon prices of agricultural products in the aggregate, and upon prices of specific agricultural products. For there are also the various distributive problems. Taking for granted an aggregate social product, greater or smaller, and taken, as already solved, the problem of the values of these products, there remain to be analyzed the terms and proportions under which these various value prod-

ucts are to be distributed among the co-operating factors, each share being regarded not merely in the aspect of an absolute compensation, but also as a compensation relative to the other compensations.

For example, what must be the effect, both absolutely and relatively, of changes in population upon land rents, machinery rents, wages, profits, and discount rates? What effect from changes in per-capita technological efficiency? From changes in the supplies of skilled labor of different sorts? Of unskilled labor? From expanding credit and increasing loan fund? From changes in the supplies of machines and appliances, both in volume and in kind? From changes by the opening up of new lands? From mproving transportation between the old lands?

And it may be noted also that, as bearing to explain the changes in the prices of consumption goods, this Law of Proportions is fundamental to the study of the incidence of commodity taxes upon consumers,—the process of forward shifting; while, as explaining the modifications in rent, profits, wages, and time discount, as distributive shares out of a jointly produced product, this law is fundamental to an understanding of the process of backward shifting.

To resume, then: This Law of the Proportions of Factors, in no matter which one of its varying formulations and applications, derives its validity from the purely mechanical and technological—and changing—limitations upon the substitution of factors one for another. But the combinations and factors with which it has to do are legion. It breaks up into sub-laws: (1) of social tenor, both static and dynamic; (2) of competitive tenor, both static and dynamic. These laws of the competitive sort have a wide range of subordinate formulations and applications,—among others, bearings upon the values of consumable goods of every sort, upon the distributive shares

of co-operating productive factors, indefinite both in variety and in technological combination, upon discount rates, upon the distribution of tax burdens, and upon the capitalized values of such productive factors as are subject to the capitalizing process.

The Law of Advantage and Size.

For some purposes the use of the terms Diminishing and Increasing Returns is extremely unfortunate, not merely because each of the terms has come to be used in a perplexing variety of meanings, but, more seriously still, because of the misleading antithesis implied.

For, evidently, if disadvantage goes with the unskilful combination of cost factors, it must also be true that advantage goes with the skilful combination. If in one case loss occurs through adding a factor already in sufficient supply, it must be equally the case that advantage accrues through increasing the supply of a factor not yet adequately present. If a falling rate of compensation goes with the making of certain increases, it is thereby implied that more of something else is needed to arrive at the best proportions between factors. And, if the bad management manifested in the bad proportioning of factors is indicated under the Law of Diminishing Returns, should not the Law of Increasing Returns connote the good results that go with the wise adjustment of factors? But this would be to give two names to what in point of causation is only one law,—the significance of the bad proportion of factors.

And more than this: if it be true that, while disadvantage is resulting to a given business through a bad proportioning of factors, an equal or a greater advantage may be at the same time reaped from the mere fact of

the mere size of the business unit,—if, that is to say, the proportions of the factors may have one causal bearing, and an increase or a decrease in the size of the unit may have another bearing altogether, irrespective of the question of proportions, there is evidently another difficulty presented. What shall we call this law—or these laws—of good or ill results attendant upon the mere matter of size? Note also that this increase of size may be attained by adding more land to land or more labor to labor or more instruments to the instruments already in hand. The proportions between factors may have little or no significance. If there are also two laws here, one of increasing and the other of diminishing returns, each appropriate accordingly as the experience is fortunate or unfortunate, we must now face the difficulty not merely of having two laws formulating the effects of one cause, but also the difficulty of using the same pair of terms for two entirely distinguishable sets of causes.

Assuming, however, so far as we may, that in current usage some approximately definite meaning has attached to the terms "Diminishing" and "Increasing" returns, it would seem desirable to rename the Law of Diminishing Returns as the Law of the *Proportions of Factors*, and the Law of Increasing Returns as the Law of *Advantage and Size*.[1]

[1] Professor Bullock has very unfortunately interpreted the Law of Diminishing Return as valid and pertinent with reference only to production upon land. ("The Variation of Productive Factors," Quarterly Journal of Economics, August, 1902.) And, while rightly emphasising the bearings of the laws of return upon market prices, Professor Bullock appears to discuss and to formulate these laws upon the assumption that their bearing upon prices is their only or their controlling reference and application. But it is clear enough that in the history of doctrine the distributive aspects have demanded no less attention than the price aspect. In point of fact, also,—as has already been sufficiently urged,—they offer the more serious difficulties of analysis, present a greater number of important theoretical bearings, and afford by far the larger occasion for disastrous errors in practical applications. And it may also be repeated that much ambiguity—as well as occasional error—must attend the failure to distinguish doses of time or labor cost from doses of value cost, and likewise must attend the failure to distinguish returns in concrete product from returns in value product.

But, even so, we are not yet quit of all our perplexities. For, after all is said, many of the advantages seemingly dependent on the sheer increase in the size of the business unit are in reality the mere expression of the fact that a bad proportion has hitherto existed between the entrepreneur factor and the other factors in the productive complex. May not this indeed be the ultimate explanation for all the advantages going with the giant organization? It is at all events clear that, no matter how many other classes of factors there may turn out to be,—whether three or three thousand,—entrepreneur ability forms one class, at the least. And this factor, or these factors, of entrepreneur ability may be in defect or in excess relatively to the other factors in the productive combination. The entrepreneur may have in charge all that he can advantageously attend to; or, on the other hand, a part of his supervisory and managerial power may be running to waste. Is then, in itself, size a distinct and separate cause of advantage? This needs looking into.

It is at any rate to be said, in support of a distinct and separate law of Advantage and Size, that there are some lines of industry and some conditions in which there clearly accrues a diminishing advantage with increasing size; *e.g.*, in farming ordinarily and in manufacturing under conditions of the limited market imposed by undeveloped methods of transportation. This situation, commonly especially characteristic of farming, is in itself an illustration of the very law which superficially it might appear to deny. Farming exemplifies the Law of Advantage and Size, only that the advantage goes not with the larger business, but rather with the smaller.

Not merely this, but the Law of Proportion of Factors not only has, as we have seen, a technological basis, but it implies, in any given set of cost levels, a best tech-

nological combination in relation to each particular entrepreneur. It is after all a Law of Proportions between different sorts of costs, some or all of which are based upon ultimate technological relations.[1]

On the other hand, the Law of Advantage and Size has seemingly little relation to the technological situation, and still less reference to the technological proportions in the business unit. For, as has already been noted, the advantages of the giant industry are readily attained through the addition of more labor to labor or more machines to machines or more land to the land already employed. The question mostly refers to the size of the investment, the aggregate operating fund of value, irrespective of its technological applications or of the apportionment of this aggregate fund among the different sorts of cost bases. Size refers here not to the kind or quantity of the instruments and appliances of production,—not to capital in the technological sense, but rather to capital in the competitive entrepreneur sense, as the total of the value resources employed in the business, irrespective of its technological or non-technological application or apportionment, whether into land or labor or machinery or what not.

This is not at all to deny that many undertakings suffer from a lack of business capital relatively to entrepreneur ability,—suffer, that is, from the fact that there is an unsaturated margin of supervisory power which is running entirely to waste. Cases of this sort, falling accurately within the Law of Proportion of Factors, are easily confused with other cases properly ranging

[1] Some of these costs are truly commonly technological, but it is equally clear that some are commonly not so. Not only is it true that the technological factors to be correlated are legion, but also that there are other costs which are entirely lacking in the technological basis, but which are none the less submitted to the necessity of proportion; *e.g.*, insurance, advertising, and taxes, and, in general, those lines of expense connected with administrative and sales departments,—clerks, book-keepers, travelling men, and the like.

under the Law of Advantage and Size. But the distinction is theoretically none the less clear. Several competing consumers may often advantageously unite, and may advantageously retain all the old managers as special department managers or as together constituting a new managerial board. The aggregate of managerial effectiveness may be appreciably greater through this fusion, and may stand as of itself an illustration of the general Law of Advantage and Size. And therewith may go also other important economies and efficiencies, not only of supervision and organization in the mechanical processes of production, but as well in the buying of raw materials and in the sale and the delivery of the product.

The Law of Advantage and Size is, therefore, a real and valid law entirely distinguishable from the Law of Proportion of Factors *and in no sense the antithesis of it.* Any industry may easily illustrate both laws at one and the same time,—may indeed illustrate the beneficial working of the one and the injurious working of the other. The undertaking may, for example, be excellently organized in point of proportions and may yet be either too large or too small; or it may be of the desirable size and yet relatively over-supplied with capital goods or with plant or with unspecialized working fund or with land; or it may be overmanned; or it may be inadequately supervised.

It is, however, important to note that for competitive purposes the law of changing proportional value productivity with changes in the size of the business unit is not safely to be taken to apply in any one line of industry regarded as a group aggregate, but only to the competing industries inside the group. For it may readily be true that the organization of any industry into the

giant form may so reduce the costs therein that, even with an expanding product by weight and tale, the aggregate product is a smaller one. And this might hold of manufacturers as a whole as over against agriculture as a whole.

Nor can the law rightly imply that greater value productivity goes per unit of expense with increasing size. This is not necessarily true. It is safe to assert only that to the greater industrial unit goes the *relatively* greater product or profit. For when the elasticity of consumption is not great, and when competition among rival businesses is close, lower prices may obtain to the extent to bring a lower value productiveness for each industrial unit and a generally lower average of value product and of profit. And yet it may remain true that the larger units suffer least, and that to these larger units there accrues a relative advantage.

Nor is the Law of Advantage and Size concerned with the fact that in industries of heavy investment and of heavy fixed charges the extra cost of successive items of product is less in proportion to the increase of weight-and-tale product,—a formulation which, as of necessity, says nothing as to the aggregate increase in value going with the increase of product, but leaves it possible to be assumed that the entrepreneur will limit his product at the point where the extra expense of production, together with the falling prices upon the original product, balances the extra value represented in the added items. In truth, cases of this sort present a peculiar illustration of the Law of Proportion of Factors; for its best results—demand for products and prices of products standing at a given level—the industry is calling for a changed proportion of productive factors, or it is being found true that the proportion of factors, ordinarily and in the long run best for value results, is temporarily not the best.

If, for long-run purposes, it is regarded as undesirable to make an all-round increase in the size of the unit, the best adjustment for temporary purposes must be reached through a proportionment of factors which would be a maladjustment for long-time purposes. This comes about through the fact that, as a long-time competition, the fixed charges must be computed as costs, and that in this competition the costs must stand as an aggregate over against an aggregate of value product. Cost for long-time purposes is rather an average than a marginal cost. But in the short-time reckoning the marginal computation is valid, if only all the elements are properly included. To this sort of marginal cost fixed charges are for the most part irrelevant.

It appears, then, that to find out what there really is in this Law of Advantage and Size it is necessary rigidly to exclude all influences of improving technique (developing human beings) and all influences ranking under increased demands for products, and to confine ourselves to the sheer competitive advantages of combination or concentration (1) for increased weight-and-tale product per unit of expense, (2) for increased value product per unit of expense.

It is obvious that no a priori reason exists why this Law of Increasing Return might not characterize all industries. If it does not or if it does so unequally, the reason must be sought in the peculiar nature of the industry in question. The law may fail to hold with certain industries, because by the nature of the instruments which they employ or of the processes required (*e.g.*, as with land), the business unit cannot greatly increase, the giant organization being impracticable; or the market may be of so limited powers of consumption as to render giant organization impossible. And, as has already been

seen, the law is clearly not one referring by necessity to the interdependence of factors or to the constitution of the business unit in respect to the factors included.

It remains to point out that this Law of Advantage and Size, like the Law of Proportions of Factors, has also its different aspects of service accordingly as it is taken in its static or in its dynamic aspects. It may be invoked to explain some of the phenomena of rising or falling prices. Or its service may lie in the analysis of the tendency of profits toward rise, or fall, or differentiation; or its significance may be found in estimating the forces making for consolidation or monopoly in business; or, finally, some bearing may conceivably be deduced upon land rents, upon the wage level, and upon time-discount rates. That is to say, this law also is fundamental in its significance for the explanation of the prices upon consumable goods and for arriving at the forces determining the outcome of the distributive process. It follows, also, that this law must be appealed to in the examination of the forward shifting to tax burdens upon consumers, and as well also in the examination of backward shifting. This backward shifting must obviously take place through the modification of the distributive shares apportioned out of a product jointly produced by the various productive factors. A tax limiting the market for any product and appropriating a part of the reduced total of value will not merely reduce the aggregate value fund to be distributed as shares to the various co-operating factors, but will commonly also appreciably modify these shares relatively to one another.

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THE RAILWAY SITUATION IN ITALY.[1]

SUMMARY.

I. Introductory. Character of railway concessions in Italy, 619.—Railways not profitable, State aid always essential, 621.—Oscillations of public and private management, 623.—Public management now settled, 625.—II. Conventions of 1885 and resumption of State operation in 1905. Three railway systems established in 1885, 627.—Complicated financial relations, 629.—Reserve funds, 631.—Inadequacy of reserve funds because of failure of traffic to grow, 632.—Other causes of trouble, as to rates and wages, 634.—Immediate occasion of resumption of State operation in 1905: procrastination in negotiations with the companies, 635; and friction with the employees, 636.—III. State operation since 1905. How far autonomy of railway administration has been established, 638.—The balance sheet and budget, 642.—How rates are regulated, 644.—Financial outcome; difficulty of reaching precise conclusions, 645.

[1] The reader is referred for more detailed information to the following documents and papers:—

Relazione intorno all' esercizio delle Strade Ferrate delle Reti Mediterranea, Adriatica e Sicula, del Ispettorato Generale per le Strade Ferrate (Ministero dei Lavori Pubblici). Roma, 1900.

Atti della Real Commissione per lo studio di proposte intorno all' Ordinamento delle Strade Ferrate. Roma, 1902–05.

Le concessioni di ferrovie all' industria privata. Relazione dell' ufficio speciale per le Ferrovie presentata del Ministro Granturco alla Camera dei Deputati. Roma, 1907.

Atti Parlamentari. Disegni di legge e relazione (Ordinamento dell' esercizio di Stato delle Ferrovie non concesse ad imprese private). No. 508 della sessione 1902–04, No. 129 della sessione 1904–05, No. 640 della sessione 1904–07.

Atti del Senato del Regno. No. 583 della sessione 1904–07.

Ferrucci. Dei contratti di esercizio delle Reti Adriatica, Mediterranea e Sicula e della loro riforma. (Annali Società Ingegneri italiani.) Roma, 1900.

Brunicardi. Il problema ferroviario e il nuova Ministero. Riforma Sociale, 1901.

Carmine. Esercizio ferroviario e progresso economico. Nuova Antologia, 1901.— Politica ferroviaria. Nuova Antologia, 1902.— Esercizio ferroviario per conto dello Stato. Nuova Antologia, 1903.

Anonimo. Il futuro aspetto delle ferrovie italiane; nel giornale Il Politecnico. Milano, 1901.

Benedetti. Le spese dello Stato per l' esercizio ferroviario, avanti e dopo il 1° luglio 1905. Nuova Antologia, 1907.

Tajani. L'exploitation par l'État des chemins-de-fer italiens. Revue économique internationale, 1905.—L' esercizio ferroviario di Stato in Italia. Giornale degli Economisti, 1906.—Railway Nationalisation in Italy. The Economic Journal, 1908.

Professor Tajani's paper has been translated from the Italian manuscript by Dr. R. F. Foerster.

I.

Introductory.—The Railways and the State in Italy.

I PROPOSE to discuss the present situation of the railways of Italy, where for the last three years nearly all of the lines have been operated by the State. Out of a total of 16,500 kilometres of road, 13,200 have been thus operated. The rest are comprised in a few minor lines of small companies, which are themselves subject to a rigorous government control.

The railway legislation of our country differs little from that of the other nations of the continent of Europe, but is very different from that of England or America. Our public law regards the construction and operation of railways as enterprises lying outside the sphere of private activity. In theory the State only can construct a railway. If a private company desires to construct a road, it must petition the State for a concession. This is not a mere administrative permission, but a strict grant of rights bestowed for a limited time. When the concession is terminated, the private company must give over its line in good condition to the State, which thereupon becomes the full proprietor. During the period of the concession the company may not sell the railroad, or modify its character, or cease to operate it. Nor may it increase the rates beyond certain maxima fixed in the contract, and it must submit to a very minute technical and administrative supervision.

Our legislation upon railway concessions is substantially as follows:—

1. A concession may be made to a private person, to a public body (province, commune, association of provinces or communes), or to a commercial company constituted in the usual way.

2. The route of the lines is generally chosen by the

petitioner, but the government reserves the right to examine and approve it.

3. In the case of a main line the concession is made by statute; in the case of a branch line, by royal decree.

4. The State almost always contributes to the expenses of construction, and sometimes also to the operating expenses, by a guarantee of interest or of income, subventions of various kinds, fiscal privileges, or grants of land from the public domain.

5. The local bodies (provinces and communes) often participate in the cost, either by compulsory or voluntary contributions on which the participation of the State is conditioned.

6. The right of the grantee is generally—(*a*) limited in time, the duration, which is variable, never exceeding ninety-nine years, and being nearly always less; (*b*) subject to repurchase after a stipulated number of years, and in some cases at will, with payment of compensation based on the earning power of the road or on the cost of construction; (*c*) subject to forfeiture for failure to fulfil the essential terms of the concession.

7. Upon the termination of the concession the line and other property revert to the grantor without any compensation.

8. The rolling stock and other movable properties usually receive separate treatment, and the State at the termination of the concession makes payment for the value of them.

9. The State (*a*) supervises the construction and the operation of the railways in the interest of safety, of the regularity of trains, and of fair treatment of the public; (*b*) audits the accounts of the company.

The reader will see that private operation of the railways implies in Italy a situation different from that of the New World. It must be added that in Italy the

railroads could never have been the basis of a private industry, since from the first not even the main lines could earn an income adequate to pay a proper return upon the capital employed in construction. Our territory is varied, and entails serious engineering difficulties. A chain of high mountains separates us from the rest of Europe, and another chain runs the length of the country from north to south. Rivers and torrents abound. There is no line which has not many bridges and many tunnels. The average cost per kilometre of the Italian lines is 350,000 lire; that is, more than twice the cost of the American roads. The operating expenses are also very high, because there are many heavy grades, and because, lacking mines, we must procure our iron and coal from other countries. On the other hand, the volume of traffic is small. As we shall see hereafter, there has lately been a marked growth in traffic; but until five years ago gross earnings did not exceed an annual average of 20,000 lire per kilometre. In these circumstances it is evident that a genuine private railway industry could not arise and prosper,—a great contrast with other countries, in which a railway concession generally implies a lucrative employment of capital.

Railways arose in our country full twenty years after they had developed and spread in Europe and America, precisely because they offered no incentive to industrial enterprise. The first real builder of railways in Italy was the State, and we may recall the memorable words which Charles Albert spoke in 1842 before the Sub-Alpine Parliament, when he asked for more railways: "I am persuaded," said he, "that I cannot better utilize the ever-growing resources and the flourishing credit of the royal finances than by procuring for the people whom God has committed to my care a new and much-desired factor in general prosperity." These words epitomize

the railway program which all of the Italian governments have since observed. It has been their belief that the railway, as an instrument of civilization and of well-being, ought to be constructed by the State when private initiative does not act. Or, if the State does not care directly to construct and operate roads, it ought to encourage private capital to do this by offering appropriate subventions. Thus some of our governments constructed railways directly, others by subvention. But almost no line has been built in Italy without government aid. The seven billions of lire spent upon the construction of our lines have been almost entirely supplied by the State.[1] In part these billions represent loans, in part they represent annual payments which are being made to various private companies. For the latter, altho no longer operating roads, have due to them from the State the sums which they devoted to construction.

The existence of the aid, and the fact that it was accorded by rather complicated provisions which sought to reduce to a minimum the burden upon the State, created between government and company ties of interest so complex that controversies continually arose which gave to the private régime a marked appearance of instability. These controversies grew out of the difficulties which were encountered first in fixing the terms of the contracts and then enforcing them. Where a private railway industry comes into existence through private capital, and subventions from public money constitute an exception, the State can confine itself to exercising such supervision and accounting as are sufficient to guarantee to the people safety of travel, and fairness and uniformity of rates.

[1] The author has already said that there are 16,500 kilometres of railroad in Italy, constructed at an average cost per kilometre of 350,000 lire. Since the product of these figures falls short of six billions, the total cost of seven billions, noted on this page, must include the 910,000,000 lire voted by the State in 1905 to make up certain deficits (see page 34). ED.

But when the State contributes largely to the construction of the roads, and then endeavors to maintain its interests through complicated contracts, which seek to regulate rates, secure for the State a share in the profits, and avoid impairment of the plant, the conflict of interests becomes so great that it is very difficult to arrive at a lasting arrangement.

We have said that Italy has not pursued a consistent railway policy. In fact, the country has oscillated between a State régime and a private régime, finding in neither a stable arrangement. We have seen why private operation of the roads could not easily endure. Administration by the State in turn met a grave obstacle in the general immaturity of our political and administrative system. The railroad is a great source of favors, it requires an enormous number of employees, it is an essential condition of all business, it involves vast interests, and it supplies an endless field for selfish desires. Such desires are especially rife in a poor country, where even the most successful industries are not in a position to scorn aid, where the competition for employment is always keen, and where many men regard the public income as a proper source of private profit. From this it is clear why the operation of the Italian roads by the State has also frequently failed.

State administration was begun as far back as 1847, upon the lines of Piedmont. In 1865 these lines were granted for 200,000,000 lire to a private company, which assumed also the operation of other lines, while the rest of the Italian railways were divided among four other companies. In 1876 there was a return to government operation, and in 1885 the roads were granted anew to three companies. In 1905 the government again took over the roads. Since the railroads were expensive and the volume of traffic was small, the results were never

satisfactory. It was supposed that better results would follow a change of system, while in fact the evil is inherent in natural factors which cannot be changed.

The point which I should like to emphasize in this first part of my study is this: the railroads of Italy have never been under genuine private management. Between the companies and the government, ties have always existed which, while they took from the former freedom of initiative, forced the latter to intervene constantly, not only to safeguard the interests of the public, but also to protect the treasury. All of the attempts to make private operation permanent, in order to avoid operation by the State, have been unsuccessful. The last return to State operation (July 1, 1905) is therefore not a genuine change of system, as such a procedure might be for America and England. These countries have seen the railroads grow up through unrestricted private initiative, with all the inconveniences, it is true, but with all the great advantages also of that system; and, if they should desire to operate the railways themselves, they would have to face the grave financial problem of purchase. In Italy the railroads already belonged to the State, which had only sold the movable properties, retaining the right of reacquisition; and consequently, as we shall presently see, scarcely half a billion of lire were necessary to liquidate the credits of the companies. The results secured in Italy by the two opposite systems, in whatever light they are to be judged, may not, therefore, in my opinion, be regarded as examples by nations which are in more fortunate circumstances. Nor should the recent assumption of State operation constitute a precedent to encourage other States, apart from reasons of a different kind, to follow our example; for it must not be forgotten that, if the economic conditions which obtained while our railroads were building had allowed a healthy and free pri-

vate industry to prosper, we should, with entire content, have avoided a system which undoubtedly presents many perils.

To-day everybody in Italy (and I include those who until the last moment discountenanced the abandonment of the private system) agrees that we shall never return to the operation of railways by companies, not even if the government system should prove unprofitable to the public, and should give rise to all the difficulties commonly ascribed to government management. This is true, not only because, after the many experiments which we have made, we have become sceptical of the possibility of framing satisfactory and permanent contracts, but also because operation by the State, in the direction which it has taken in the last three years, has become very popular. As, in Roman times, the people demanded *panem et circenses*, so to-day they insistently demand reductions in rates and increases in the number of trains, without any regard to the effects which these favors may have upon the State budget. The disposition to travel, which in our poverty-ridden country for a long while showed itself but slightly, has in the last few years developed in an extraordinary manner. And, despite the fact that many economists and government officials do not fail to warn against the dangers of a too liberal policy, the mass of the people urgently demand reductions in the rates of transportation. It is significant that such reductions are more generally demanded than reductions in our burdensome income and consumption taxes.

It must be added, however, that the conviction is also spreading among economists that an increase in traffic may indirectly lead to such an increase in public wealth as will compensate for the sacrifices of the State. In new countries reductions in railway rates produce results of far-reaching importance, which are reflected in the general

wealth even when railway finances suffer. True, Italy is not a new country; but she is undergoing a process of regeneration not unlike that which occurs in a country which is passing from a lower to a higher stage of economic development. And a school is growing up, influenced in its principles by the German economists, which holds that railway transportation may be regarded from two points of view,—from that of pecuniary gain and that of the public interest. In the first case the railway is regarded as the means to an immediate profit. In the second the pecuniary interest is subordinated, and concern is had only for the advantages which the public may derive from the transportation service. At the far extreme of this second tendency there is the utopian idea of free transportation, which, strange as it may seem, has more than once been seriously considered in Europe. But, without going to this extreme, there are many who see, and firmly believe in, the expediency of disregarding considerations of profit and of devoting the railways more fully to their function of serving the public. Gain is to be sought, not in the narrow budget of the railway itself, but in the economic budget of the nation. Of course, only a State railway system can act upon this principle.

It is easy to see the dangers of such a tendency, which in the vagueness it fosters would make restraint almost impossible. Especially in countries of representative government, legislation is likely to be inspired, not by a careful estimate of the public benefit, but by motives of a political nature. Nevertheless, it cannot be denied that the tendency exists, and is responsible for the constant growth of State operation.

With this preliminary survey we are in a position to estimate at their right value the facts which the following two chapters will set forth. One of these will discuss

the private operation of the roads in Italy during the twenty years 1885–1905 (the earlier period is already well enough known), while the other will discuss the methods and results of State operation in the last three years.

II.

The Conventions of 1885 *and the Return to State Operation in* 1905.

From President Hadley's classic volume on Railroad Transportation as well as from later studies, the American reader has already learned the relations which the conventions of 1885 established between the State and the private companies in Italy. We need only to recall briefly those relations.

In 1876, after the failure of the private companies, the government of Italy had to buy back a large part of the lines constructed up to that time, and operate them upon its own account. This action was hastened by the Conservative political party, which favored operation by the State. Before, however, the terms of the acquisition had been arranged, the Liberal party, which favored private operation, had come to power. Thus it happened that operation by the State, being regarded as a provisional expedient, was not planned seriously, nor with reference to a long continuance. This fact surely contributed to the unfortunate results of the experiment.

On the other hand, the roads were in bad condition, and the situation of the treasury was far from flourishing. The economic status of the country was depressed, and traffic therefore small. Operation by the State produced results which gave satisfaction to no one.

A commission of investigation was appointed to study the problem carefully and decide upon a scheme of operation. The commission advised a return to private opera-

tion. But since the railways had always belonged to the State, and it seemed neither opportune nor possible to sell them, recourse was had to a special form of contract, by which the companies leased the lines, and bound themselves to operate them according to special terms. Such a contract was then in existence in Holland, where, it was said, it had resulted well. Thus arose the conventions of 1885, which brought about an arrangement intermediate between private operation and State operation, containing elements of both. The peninsular lines (the Sicilian roads were separately treated) were divided into two large systems. Granted that it was desirable to divide the continental lines into two systems, the method of division adopted (namely, from north to south) was undoubtedly the best. As a matter of fact, trade in Italy very generally follows such a direction. The North sends its manufactures to the South, the South its agricultural products to the North. The division therefore was calculated to stimulate in some degree competition between the two peninsular systems. Other considerations also, such as an approximately equal mileage and the same number of approaches to passes into other countries, helped to place the two lines upon an equal footing.

Three systems were thus formed, the Mediterranean, the Adriatic, and the Sicilian. The Adriatic system was entrusted to the already existing Italian Company of Southern Railways, the other two to Italian companies formed for the purpose. I emphasize the national character of the companies because in the previous combinations foreign capital, another disquieting element, had predominated.

The duration of the contracts was fixed at sixty years, divided into three periods of twenty years. At the expiration of each period the contracting parties had the right, upon two years' notice, to dissolve the contract.

In 1885 there were 10,066 kilometres of railway in Italy, of which 8,774 were distributed among the three important companies, and 1,292 were in the hands of small companies, which still operate them. The Mediterranean system had 4,046 kilometres, the Adriatic system 4,131 kilometres, the Sicilian system 597 kilometres. Here let us note, as we shall not again return to the point, that appropriate clauses of the contract provided for an extension of the railways. This was important, since our country was then, even more than to-day, scantily supplied. The construction of new lines was entrusted to the three operating companies, which commanded abundant capital and credit. Thus it happened that in the twenty years 1885–1905 the railways constituting the three systems increased about 50 per cent.; or, in other words, by July 1, 1905, the Mediterranean system had increased to 5,734 kilometres, the Adriatic to 5,652 kilometres, and the Sicilian to 1,079 kilometres,—a total of 12,465 kilometres. The cost of installing the 12,465 kilometres amounted by that date to 5,200,000,000 lire, besides 560,000,000 lire for rolling stock.

Let us see now what were the financial relations established between the State, as proprietor of the lines, and the lessee companies. This was, of course, the most difficult matter to arrange. It was determined, first of all, that the companies should purchase the rolling stock (locomotives and cars) and other operating appurtenances (furnishings, tools, and movable property in general) as well as the supplies on hand when the act was passed (the total valued at 265,000,000 lire). At the expiration of the conventions the State, by repaying the sums expended, should acquire possession of this property. These sums were a kind of surety that the companies would perform their obligations. Since they were also a virtual loan to the State, destined to be used for betterments

of the railways (the conventions obliged the State to deliver the lines to the companies in good condition), the treasury paid an interest upon them of 5 per cent.

The operating expenses fell to the companies. These included maintenance of way and of structures. But for extraordinary expenses, whether for maintenance, renewal, or permanent way and rolling stock,—expenses, in other words, which properly fell to the proprietor,—there were created reserve funds.

The gross earnings, it was agreed, should be distributed as follows. What was called the initial product was first treated. This was fixed at 112,000,000 lire for the Mediterranean system, 100,000,000 for the Adriatic, 8,000,000 for the Sicilian. Of the earnings up to this point, 65½ per cent. were to go to the companies, 27½ per cent. to the State, and 10 per cent. to the reserve funds. When the earnings exceeded the initial product, the excess was to be divided as follows. Up to 50,000,000 lire (for the two large companies), 56 per cent. should go to the companies, 28 per cent. to the State, 16 per cent. to the reserve funds. Of the excess above 50,000,000 lire, 50 per cent. of the earnings should belong to the companies. For the Sicilian system, whose volume of traffic was much smaller, the following division was adopted. 82 per cent. should go to the companies for their ordinary expenses, 3 per cent. to the State, 15 per cent. to the reserve funds. Any excess up to six and a half millions should go in the proportion of 74 per cent. to the companies, 6 per cent. to the State, 20 per cent. to the reserve funds; above six and a half millions, 64 per cent. to the companies, 16 per cent. to the State, 20 per cent. to the reserve funds.

Besides thus sharing in the gross earnings the State was to receive a part of the net income from operation whenever the dividends exceeded 7½ per cent. Its portion would then be one-half of the amount above this rate.

This arrangement applied only to the lines existing in 1885. But for the lines constructed later by the companies themselves, during the period when the conventions were in force,—lines which were called complementary,—50 per cent. of the gross income fell to the companies, 40 per cent. to the State, and 10 per cent. to the reserve funds. In addition the State annually paid to the companies a fixed amount of 3,000 lire per kilometre operated. When the income reached 15,000 lire per kilometre, the line was annexed to the main system, and its revenues treated as already explained for those systems.

The reserve funds were of three kinds, destined respectively: (*a*) to the repair of roadway and buildings when damaged by unavoidable accidents; (*b*) to the renewal of plant, as it depreciated through use; (*c*) to the renewal of the rolling stock, as it was worn out. These three funds were kept up, as we have seen, from a share of the earnings, variously distributed among the funds.

There was also instituted a fund for capital improvements (*Cassa per gli Aumenti Patrimoniali*) in which were to be placed the sums necessary to provide for new construction or the betterment of the completed property, as well as for the acquisition of new rolling stock. This fund was to be supplied from the proceeds of 3 per cent. bonds issued by the companies, but guaranteed by the State, maturing in ninety years. 15 per cent. of the income above the initial product was to be used as a sinking fund.

The State reserved to itself the right to approve rates, time-tables, and plans for construction and the supply of rolling stock.

Undoubtedly, as may be seen, this edifice was well conceived, but its basis was extremely complicated and precarious. In order that all should go well, it was essential that the estimates upon which the calculations

were based should be realized. But it is easy to see how difficult it is to predict exactly concerning matters of this kind. And, in fact, the chief defect of the Italian railway conventions of 1885 was the error in the financial anticipations. I must add that the error was to some extent voluntarily incurred, since, as happens in such cases, in order to facilitate the making of the contract, considerations which might reasonably have cast doubt upon future results were eliminated from the arguments.

So much for the conditions which led to the failure of our conventions. The causes which inspired both State and companies to ask for the dissolution of the contract at the end of the first period, on July 1, 1905, thus destroying after twenty years an agreement which might have lasted sixty, may be classified into essential causes and occasional causes.

Among the essential causes, which depend upon the errors of prediction that we have referred to, must be mentioned, first of all, the failure of the fund for capital improvements. In this fund it was expected to accumulate the capital necessary for new construction, new rolling stock, etc. New construction and new equipment are necessary to a railroad system if and in so far as the traffic and, consequently, the earnings increase. Hence this fund was to be maintained from the increase in the earnings. In the years before 1885 there was a considerable and continuous increase. It was supposed then that this situation would last. But, as so often happens, the period of expansion was followed by one of depression and recuperation, and the revenues of the railways, which up to 1885 had been increasing, remained stationary after 1885, and positively diminished a few years later, when a profound economic crisis was felt through all the countries of Europe. From the very beginning there was no provision for the issue of securities which would supply the

capital necessary to new construction and to the purchase of new equipment. The need for such expenses appears even when the revenues do not rise. To illustrate how divergent were forecasts and reality, it may be pointed out that the fund for capital improvements, which in the twenty-year period should have received not less than two hundred millions of lire, actually received only eighty.

Nor did the reserve funds fare better. They were intended not only to provide for construction and renewal of roadway and equipment, as need arose, but also to accumulate the instalments for amortization and provide for the depreciation of way and rolling stock. The equipment, however, had been calculated to last much longer than proved actually to be the case. And so it happened that the funds accumulated during the twenty years fell short of the requisite amount by one hundred and fifty millions of lire.

It was a consequence of this divergence of forecasts and actuality that the State, which expected to hold aloof from any part in the financial management of the roads, found itself, in fact, pressed by the companies to make up the deficits. As proprietor of the lines, it should perform a function which the reserve funds had failed to perform automatically. When the public complained of lack of cars, and insufficiency of side tracks and of storage terminal facilities, it was invited by the companies to direct its complaints to the government. The government in turn sought to exonerate itself by charging the companies with having devoted an excessive part of their income to operating expenses. Naturally, these disputes delayed the necessary provisions still further, and intensified the lack of facilities to such an extent that at one time it became necessary to lease many cars from other European railways,—an expedient which proved very costly.

Without going into further detail, we may say that the

chief cause of the failure of our conventions was the attempted separation of the obligations of the State as proprietor from those of the companies as operators. This separation, inevitable tho it was, was sure to lead in the end, through a division of interest and responsibility, to a loss of efficiency and to bad service.

Let us take up another of the essential causes. Altho rates had to originate with the companies, the right to approve them had been reserved to the State. But it did not fail to happen that the State, under pressure of interested parties, took the initiative in making reductions which the companies were unwilling to grant. Then the State, as the terms of the contract gave reason to foresee, offered to pay the difference between the rate which it proposed and that which the companies had agreed to. Here, again, was an abnormal situation. The consequent loss of the State was probably greater than it would have been if the State had itself operated the railways. Besides, the possibility of further accommodations of the same sort led the companies thereafter to await pressure from the State in the matter of reductions.

A third cause was in the dealings with the employees. By the conventions the employees then in service were to continue under the companies, and were guaranteed fair treatment and the same terms as before. But the guaranteeing clause was not read in the same way by the employees and by the companies, and the State took sides with the former. This third dispute ended like the others. The employees threatened a strike, and the State, intervening to avoid the grave consequences which such a disturbance might have had for the country, declared itself willing to assume the burden of paying the difference between the remuneration which the companies were willing to grant and that which the State deemed just. In this way the companies were relieved of the

gravest of industrial risks, while a source of hazardous disputes arose for the State.

In spite of all these difficulties the transition to State operation would not have come so soon, had not the other causes, which we have termed occasional, made it inevitable. State operation had not yet found confirmed advocates among the economists and public men of our country. Many were of the opinion that, before accepting government operation, every effort should be made to maintain private operation by perfecting the old contracts. A commission of investigation which was appointed to study the problem advised, after a long and careful research, that private operation be retained. But it called for modifications which the companies would probably not have accepted. And in any case, because of the elaborate nature of the investigation, its results appeared too late to throw light upon the important question. In this indecision the opportune moment slipped by. The conventions could not be renewed unless the contracts were modified, since the companies, which had distributed few dividends during the twenty years, demanded an increase in the proportion of the earnings allowed them. On the other hand, the possibility of State operation roused great concern because of the dangers which were generally attributed to it. The situation had become such that, since new contracts were impossible, operation by the State was the inevitable solution.

An added factor hastened its coming. The Socialist party, which had by this time grown strong in the Chamber, favored State operation as a matter of principle. Some saw in it a first, if slight, step in the direction of collectivism. The Socialist party succeeded in attracting to itself other groups in the Chamber, among them the labor parties. The railway employees, who are a solid

organization with a socialistic tendency, saw in the suppression of the companies the possibility of new material advantages.

The government meanwhile, while still negotiating with the companies for the continuance of the contracts, thought it well to be prepared for the failure of its efforts to negotiate, and proposed a law for the operation of the roads by the State. This law included provisions which sought to prevent strikes by the employees. Against these provisions the employees at once went upon a strike, hurling defiance at the Parliament. The Chamber took up the challenge, and after almost no discussion voted a law (April 22, 1905) which decreed State operation upon the three systems, and retained the severe measures which the employees had contested. This accident—such one may term it—proved the immediate occasion for the return to State operation in Italy.

The law of April 22 was a provisional law, which, since it has been replaced by the definitive law of July 7, 1907, we will not discuss. Nor shall we stop to consider the later law (since it was only an episode) for the redemption of the lines (about 2,000 kilometres) which had belonged to the Company of the Southern Railways. These lines were only incorporated in the State system on July 1, 1906, a year later than the others.

From what we have already said it is clear that no serious financial difficulties stood in the way of State operation. The only payment which the State had to make to the companies was a payment for the value of the equipment. This amounted originally to 265,000,000 lire. The total required on equipment account, including provision for new rolling stock, was about 500,000,000 lire. This comparatively small sum could be secured from funds available in the treasury.

The roads, when turned over to the State, were, how-

ever, greatly defective in permanent way as well as in equipment. We have seen that the companies had been freed from the necessity of providing for improvements in permanent way and rolling stock, and that the reserve funds had not been sufficient to provide for these. We have seen also that the government and the companies had not found it possible to agree upon the means for adding needed facilities. From the financial point of view the greatest problem was that of providing the funds necessary to make up these great past deficiencies. This the State accomplished by three successive laws which placed at the disposal of the Railway Administration of the State the sum of 910,000,000 lire to be paid by 1911. This sum was procured in part from funds supplied by the treasury and in part by loans.

III.

State Operation since 1905.

It is well known that the administrative arrangements of European governments are predominantly of a centralized type. The auditing of receipts and the disbursement of expenses are undertaken by central organs which have a direct jurisdiction over the entire financial operations of the State. It is easy to see to what consequences this system leads. Everything that the government does is done slowly and clumsily by reason of the thousand formalities which must be observed. We generally epitomize these defects in a single phrase: the State is a poor business man. And, indeed, the slowness in reaching decisions and the awkwardness of excessive accounting lead, in the case of State industrial operations, to a lower final profit than that which a private company would obtain.

With these considerations in mind our government,

when it prepared the laws for State operation, was wisely careful to establish the administration of the railways upon a purely industrial basis. The railways were not to become a part of the great State machine, and take on the slow, awkward movement of that machine. This is accomplished by creating an "autonomous" administration for the railways,—the term was in fact applied to the new organization. The principle of autonomy requires a few words of explanation. It is necessary to distinguish between an autonomous governmental administration and an autonomous entity. The latter, the autonomous entity, controlling its own budget, can have no place in a country of representative government. Like the other branches of public administration, the railway administration must be governed by a responsible ministry. Tho the ministry may delegate its powers of management, it must always be responsible to Parliament and the country. As Deputy Rubini correctly observed in an admirable report to the Chamber, a resolute step is necessary in order to attain and conserve autonomy proper. The administrators should be made responsible to a judicial body, having power of supervision and veto, and chosen without reference to political rivalries,—a kind of economic parliament in which should be represented all of the interests which depend upon the railway. Until this is done, it is impossible to think of an entity with functions independent of the executive power. The truth of this is enforced by the experience of other nations where State operation has long obtained, or has been recently adopted. But, while the creation of an autonomous entity is out of the question, none the less the technical character of railway management requires that the various methods of audit and control should be reduced to manageable limits. Of course, it must not be inferred that the employment of the public moneys need no longer be

scrutinized; and that the railway budget, with its great size and its uncertain and changing character, should not carefully be held from interference with the State budget.

Let us see in what concrete form the principle of autonomy has been embodied in our laws.

First of all, railway administration, unlike the other departments of the State, is not immediately dependent upon the ministry. It is intrusted to a council composed of eight members and a presiding Director-General. Two of the councillors are chosen from among the railway officials of the State, three from among the officials of other government departments, and the other three from among citizens who possess technical or administrative attainments, and who, when nominated, become State officials. The Director-General and the councillors are appointed by royal decree on nomination of the Minister of Public Works and with the consent of the council of ministers. A councillor cannot hold another parliamentary appointment. The Director-General cannot hold another parliamentary or elective office. Each group of the council is to be renewed periodically, the initial changes taking place by lot. Half of the State railway officials are elected every two years, and may be successively re-elected. A third of the councillors of the other two groups are elected each year, and may be re-elected only once. The Director-General and the councillors cannot be removed or suspended from office except by a royal decree giving reasons, and the council of ministers must have consented. By these means it is sought to obviate political interference.

It is the business of the council to regulate the various functions of the administration; to consider the budget; to approve new projects and contracts; to authorize lawsuits or to accept amicable settlements; to approve busi-

ness agreements, exchanges or leases of rolling stock, the use of joint stations with other transportation companies, and agreements for special rate reductions; to approve sales of property; and to confer upon the treatment to be accorded to the employees,—in matters of discipline, for example.

The Director-General is the representative of the administration. He approves plans involving sums not exceeding 50,000 lire; he gives contracts to successful bidders at public or private auction, when a value not exceeding 20,000 lire is involved; and he makes private contracts for labor and supplies to an amount of 5,000 lire. He authorizes lawsuits or amicable settlements involving a value not over 10,000 lire. And he approves and authorizes the beginning of urgent work for which the sanction of the council is necessary. He is assisted by two Vice-Directors-General for the construction and operating departments, respectively.

The Director-General and the councillors are responsible to the State for damage done to the railways through infraction of laws, negligence, or abuse; and they are subject to the jurisdiction of the Court of Accounts, which is the general auditing body for all the affairs of the State.

The direct interference of the minister in the affairs of the railway administration is thus impossible. But, as we have already said, the administration must be responsible to Parliament, and it was therefore necessary to institute a power which would supervise its acts, and forbid acts which were contrary to law or the interests of the State. The minister, therefore, either upon his own initiative or upon request, can declare unlawful, by a decree giving his reasons, any act or decision of the administration which is contrary to the laws and regulations. For important reasons the minister can also suspend, or, following a discussion by the council of ministers, veto,

the acts of the railway council and the decisions of the Director-General. But, of course, he cannot substitute his own orders for those which he suspends or vetoes. In order that the minister may exercise these powers, it is required that the railway administration submit to him within twenty-four hours the records of its own deliberations. The minister has the right and the duty to acquaint himself by whatever means seem to him best with the progress of railway affairs. The approval of the nominations and the promotions of the more important officials is reserved to him. He authorizes the terms of the more important contracts for construction or purchases of materials, when these are made otherwise than through the highest bidder.[1]

It is evident that autonomy exists, however it be circumscribed and qualified. At present it is impossible to say whether these arrangements, which date only from July, 1907, are sufficient to their purposes. Probably they will be, however, when some details are corrected and when they are construed with a certain liberality.

Autonomy should have placed the management of the railways outside the sphere of political influence, which is always dangerous in countries of representative government. But this is very difficult to accomplish. If the government desires to impose upon the railway service a policy determined by political considerations, it always succeeds, because, in spite of the restrictions of the law, it has a moral influence which is difficult to oppose. A state of conflict between the party in power and the administration of the railways is inconceivable.

It is pertinent to note here another danger of a political character, which is generally attributed to State operation. The party in power, it is said, may command the

[1] Our law for State accounting requires that all purchases of supplies and all contracts issuing from the treasury shall be made at public auction. Private negotiations are permissible only by way of exception.

electoral strength of the army of railway employees, which in Italy numbers 130,000. That this is not a real danger follows from the fact that the State pledges itself to retain the railway employees in service until they reach the age limit, when they receive a pension. In other words, the State engages its employees for life. The employee has no occasion for showing loyalty to a party which cannot take his employment from him. As a matter of fact, the great railway labor organization of the country, the Syndicate of Italian Railway Workmen, has manifested socialistic tendencies, and opposes at the elections the Constitutional Party in office to-day.

In any case the law, in order to maintain some parliamentary control upon the work of the administration, has created a parliamentary Commission of Vigilance. This commission, which is composed of six senators and six deputies, elected by their respective Chambers, is empowered to supervise the conduct of the railway service in a comprehensive way, and to make an annual report upon it to the Parliament.

Let us next consider the balance sheet as regulated by law. First it must be noted that the value of the roads and the equipment has not, as might appear logical, been debited to the State administration of the railways. The railways have been constructed or acquired by expenditures from the treasury, and the latter ought, perhaps, to claim from the autonomous administration interest on the capital invested. But we have already explained that the Italian railways, taken as a whole, yield no direct profit to correspond to interest upon the capital expended. If such a return had been demanded, the balance sheet would always have shown a deficit. Instead, the principle has been accepted that the transportation service should return to the treasury the same net income (about

fifty millions) which the companies had received in recent years, and in addition should create sinking funds for all advances which the treasury should make from its own resource, lest there should be further deficits on capital account.

In the balance sheet, then, income and expenditure are distributed as follows. Income is ordinary or extraordinary. In the former are included the earnings from traffic, reimbursements, rentals from third parties or other government departments, and, in general, the entire operating income. Extraordinary income comprises the sums supplied by the treasury for extraordinary expenditures, or expenditures on capital account.

Expenditure, likewise, is ordinary or extraordinary. The former includes operating expenses, as for labor, fuel, maintenance of way and equipment; "supplementary" expenses necessary to repair the damage done by serious accidents, and to provide for the renewal of permanent way and equipment; "accessory" expenses, for interest and sinking fund instalments on advances from the treasury. The last two groups correspond to those to which were assigned, during the period of private operation, the reserve funds and the funds for capital improvements. The extraordinary expenditures are those devoted to the increase of the property. They are paid out of extraordinary income.

The railway budget, embodying both income and expenditures, is submitted for approval to the Parliament, together with the budget of the Minister of Public Works.

The creation of a reserve fund, through annual payments amounting to 2 per cent. of the earnings, is obligatory until 30,000,000 lire are reached. This fund provides the sums necessary for unforeseen requirements of the service, for which the budget appropriations are insufficient, and, besides being a true reserve fund to be utilized in

years of low earnings, it is a means of avoiding the necessity of passing laws to allow the budget appropriations to be exceeded. It has been found in practice that the payments made into this fund have been too large, and they will therefore be reduced to six millions of lire.

The determination of rates has the same basis now as in the period of private operation. It is governed by two principles: only by law can the rates be raised, but a royal decree is sufficient to lower them. In other words, the government can diminish, but not increase, the rates of transportation, just as it cannot increase the taxes without the consent of the Chambers. Royal decrees providing for reductions can be revoked when the experience of one year so advises; but, if maintained, they must be confirmed by law. The Director-General may grant temporary reductions by making special contracts with shippers.

In the matter of rates the law has, however, provided that the railway administration be advised by a consultative body representing all the interests of the country. It has, therefore, created a General Traffic Council, with the Minister of Public Works or the Director-General (vice-president) as chairman. The council is composed of representatives of all the government administrations (war, navy, posts and telegraphs, patents, etc.), of the higher officials of the State railways themselves, of representatives of the secondary railways and of the street railways, of seven citizens chosen for special technical or legal ability in railway matters, of representatives from the Chambers of Commerce and from the agricultural societies, and, finally, of a representative of the press and of two representatives of the railway employees. This large body is called to discuss all questions of rates. It considers the cancellation of existing rates and the establishment of new ones, proposals for increase or decrease of prices, the nomenclature and classification of freight,

the interpretation of the contracts of transportation, and the relations of the railways and the public.

Let me now turn to the results of the first three years of State operation. Properly to appreciate these, the reader must remember that the beginning of the new system of operation coincided with the appearance of a phenomenon of great commercial expansion, common both to Europe and America. The measure of this expansion in Italy is revealed in the figures for imports and exports, which grew from 2,500,000,000 lire in 1897 to 3,800,000,000 lire in 1905. This expansion was strongly reflected in the business of the railways.

The following table gives the course of earnings, at intervals of five years, from 1885 to the present, on the three great systems:—

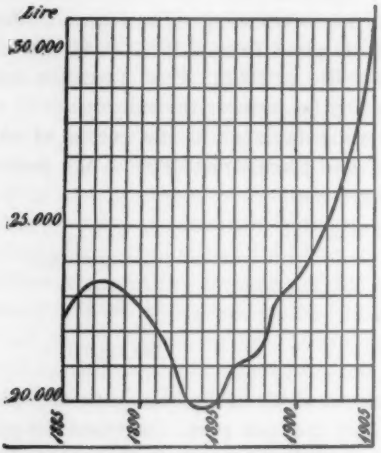
Year.[1]	*Earnings.*	*Increase.*
1885–86	207,922,670 lire	
1890–91	241,541,077 "	16 %
1895–96	247,496,615 "	2.5%
1900–01	294,855,234 "	19 %
1905–06	382,173,071 "	29 %

The earnings, which in the quinquennial period 1891–96 increased only 2.5 per cent., increased 19 per cent. in 1896–1901 and 29 per cent. in 1901–06. The average annual increases for the three periods were respectively 0.5 per cent., 4 per cent., and 6 per cent. The freight traffic, which in 1903 was only twenty millions of tons, reached thirty millions by 1907. And yet in the last five years, except in the case of small branch roads, no new railways have been constructed.

More instructive is the following diagram, which indicates year by year, for the period 1885–1905, the gross earnings per kilometre of road. How serious was the

[1] The fiscal year is from July 1 to July 30.

effect of the depression is evident from the fact that ten years were necessary to restore earnings to the figure of 23,000 lire per kilometre, which had been attained in 1888. And the exceptional developments of recent years are shown by the fact that the earnings per kilometre reached 31,000 lire, the greatest amount ever attained. In 1905–06, the first year in which the State assumed the operation of the roads, there was an increase of about



GROSS RECEIPTS, PER KILOMETRE, OF THE ITALIAN RAILWAYS, 1885–1905.

thirty-one and one-half millions in total earnings over the previous year. This 10 per cent. increase is very exceptional, since in normal times, even in the richest and most advanced countries, the year-to-year increase does not exceed 5 per cent. The increase in earnings continued in 1906–07, when the total reached 424,910,776 lire, or 12 per cent. more than the previous year; and also in 1907–08, when the earnings were 473,128,768 lire.

In contrast to this increase in earnings was the dubious situation existing at the time of the change of régime. In the preceding years the companies had neglected to replace the cars worn out, and to supply cars to meet the new exigencies of traffic, and they had neglected to prepare the roads for heavier traffic. And, when they decided to operate the roads no longer, even the current service began to lapse. The new State administration, improvised in but little more than a month (the provisional law was passed April 22, 1905, and the new administration began on July 1, 1905), had to face the immediate necessity of supplying enormous deficiencies in the equipment, and of inventing a new system of operation. Of 2,664 locomotives which the State received on July 1, 1905, 798 had been in service for thirty years, or as long as they could properly remain. Of 6,895 passenger cars, somewhat less than half, 3,077, had also had thirty years of service, and 10,000 out of a total of 52,778 freight cars had been in service forty years. There were also too few employees, because the companies in their last years had not taken on new men, and those whom the State now took on could not immediately perform their tasks.

In consequence of these difficulties, the State could not at once give satisfactory service. Loud complaints were raised against the lack of freight cars and the delays of passenger trains. The distrust of State operation became so pronounced that its future would have been seriously menaced if a return to private operation had been feasible. In memorable sessions of Parliament, deputies of all parties cast bitter reproaches upon the railway administration, and some went so far as to demand an investigation into the causes of the disorders.

But time justified the arguments of those of us who ascribed these disorders to the inadequacy of the equipment in the face of an extraordinary growth in the volume

of traffic, and to the lack of preparation which had accompanied the sudden passage to State operation. As time went on, new locomotives and new cars were added. The most urgent construction work was carried out, and so the greatest deficiencies were met. The organization of the service, hastily effected at first, has been improved and strengthened, and it is fair to say that, tho still incomplete, it is now in normal working order.

In the disordered conditions which we have described, it was not to be expected that the financial results could be brilliant. In such circumstances, expenses necessarily mount. Moreover, the treatment of the employees, who had by various strikes voiced their discontent against the companies, was greatly bettered by the State. The following figures indicate the average pay per employee during the period of private operation and that of the State.

Years.		*Average Pay per Employee.*
Private operation	1900	1,298 lire
	1901	1,295 "
State operation	1905–06	1,411 "
	1906–07	1,491 "

This change in the compensation of the employees has greatly affected operating expenses, since European railways, unlike American railways, have 300 to 400 employees per kilometre. Two-thirds of their total operating expenses are spent on wages.

With these reservations, let us consider summarily the finances of the roads. We may compare the accounts of one year of private operation with the last two years of State operation.

	Private Operation.	*State Operation.*	
	(1904–05)	(1906–07)	(1907–08)
Gross income .	348,265,275 lire	429,910,776 lire	473,128,768 lire
Expenditures .	282,687,578 "	382,253,177 "	435,992,584 "
Net income . .	65,577,697 "	45,657,599 "	37,136,184 "

Thus there has been not only an absolute increase in expenses, but also a relative increase. Yet it would be unfair to draw inferences from these figures without bearing in mind several considerations. Some of these we have already set forth, such as the impossibility of keeping down expenses while the system of operation is being changed, and the more generous treatment of the employees. But it is important to remember also that, as happens in all periods of great commercial expansion, a great rise in prices has taken place in the last few years. This rise has increased operating expenses not only upon the Italian railways, but upon all the railways of Europe, not excepting those, like the French Company roads and the Prussian State roads, which are reputed to be managed with the greatest economy.

An important additional circumstance, however, makes the expenses appear greater than they really are. We have already seen that one of the gravest defects of the system of private operation lay in the insufficiency of the renewal funds. It will seem obvious, then, that, when State operation was introduced, an effort should be made to provide for these funds in a more liberal measure. The effort was well advised, but it introduces a difficulty in the comparison of accounts.

We have already said that the railway balance sheet was to include the interest and amortization of all the expenses for property incurred by the State when the new system was put in operation. These were largely intended to supply the deficiencies of the past. The expenditures for 1907–08 were as follows:—

General expenses	47,931,172 lire
Operating expenses	301,966,662 "
Complementary expenses	32,150,000 "
Accessory expenses[1]	53,944,750 "
Total	435,992,584 lire

[1] For the definition of Accessory and Complementary expenses see pp.

The table shows that the accessory expenses, which are not of a recurring sort, are so large as seriously to affect a comparison with the earnings. To discover, therefore, to what an extent State operation is more costly than private operation, it would be necessary to make an analytic study of the expenditures, comparing them, item by item, with those of private operation. Such a study, however, would be long and tedious, and extremely difficult to bring to a precise conclusion.

Nobody in our country believes that the State can operate the roads more cheaply than private companies could. This follows from the fact that governments, especially representative governments like ours, are readily influenced to reduce rates and to enlarge facilities and trains without inquiring far into the industrial justification of these provisions. This has been our experience. Under State operation we have liberally reformed our passenger service, we have greatly lowered rates, and we have increased the number of trains and the comforts of travel. Some of these provisions encourage traffic, and may have the effect of increasing earnings; but, in general, such liberality is not consistent with a good financial showing. Yet financial loss does not necessarily prove that the management has failed to be for the best interest of the community as a whole.

My own belief, which I state without reference to the argument of the present study, is that the economic evolution of the world is proceeding in the direction of State operation. The day will come when all the great nations will entrust to the State the duty of operating their railways. It will, doubtless, be wise not to hasten that development, and to allow it to ripen of itself. But this opinion should in no way affect the conclusions which the reader may draw from the facts and figures which I have presented. At the risk of seeming to lack an opinion, I

have sought simply to explain Italian conditions as they are or have been, and I desire to repeat that the experience of Italy cannot be of much value to other countries. Italy adopted State operation, not for political reasons, like Germany, Russia, and other countries of Europe, but because, lacking an industrial basis for the support of the railways, it could successfully follow no other course.

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RAILWAYS IN NEW ZEALAND.[1]

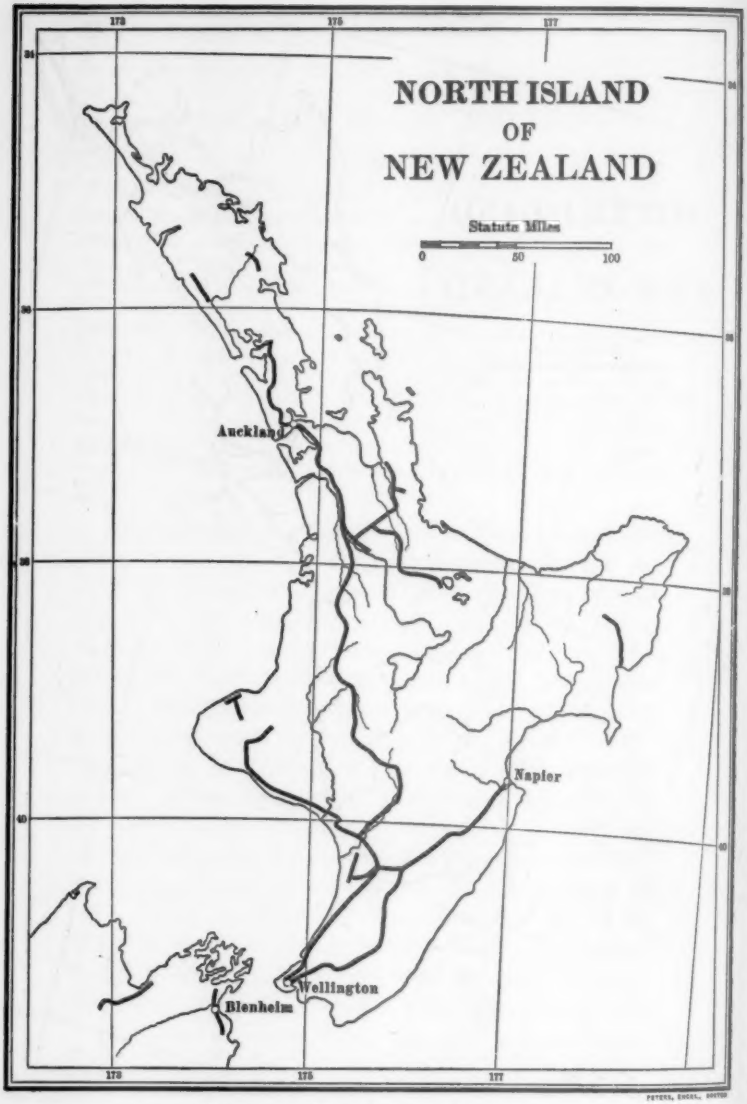
SUMMARY.

Early construction by provincial governments, 657.—Vogel's vast scheme of expansion in 1870, under general government, on borrowed money, 658.—Deviations from the original plan, through political influence, 660.—Expansion, followed by collapse in 1879, 661.—One important private railway, 662.—Bought up by government in 1908, 664. —The railways, narrow gauge and light, 666.—Traffic, rates, length of haul, 668.—Uniformity of rates, 670.—Commission administration, 1889–94, succeeded by direct governmental administration, 671.—Improvements charged to capital account, 672.—Net earnings insufficient to pay interest on debt, 673.—The deficit larger than the published figures indicate, 675.—Causes of the deficit, 678.—Railways should not be built or operated at financial loss because of supposed social utility, 685.—Recent movement for economy, 690.—Return to private ownership nowhere proposed, 692.

THE early European settlements in New Zealand, like those in America, were established on or near the seacoast, with a rugged and almost inaccessible back country, into which the settlements gradually extended by means of roads. The numerous rivers, few of which were navigable, were a hindrance rather than a help to communication, particularly in time of flood, when bridges were carried away, fords rendered impassable, and even ferries were not to be relied upon. Because of the abundant rainfall, varying from twenty inches or less in the interior of Canterbury to one hundred inches or more in some parts of the west coast, ordinary unmetalled roads were quite useless for wheeled vehicles during many months of the year. People travelled on foot, on horseback, or by bullock sledges that moved along at a snail's pace through mud and mire. In remote parts of the Dominion these primitive conditions continue until the present day.

[1] The writers desire to thank Professor James Hight, of Canterbury College, who has been so kind as to read the MS. before publication. They are indebted also to a number of other gentlemen for valuable information and suggestions.

Sketch of New Zealand Railways



SKETCH OF NEW ZEALAND RAILWAYS

"This may be God's own country," said a settler in one of the back blocks, "but we have the devil's own roads."

The early settlers fully realized their need of roads, and their leaders sought to provide funds for making them. Edward Gibbon Wakefield, the founder of the New Zealand Company, held that the company's land should be sold at a "sufficient" price, and that the revenue therefrom should be spent on immigration and public works, chiefly roads and bridges.[1] In the company's settlement of Wellington the price of land was fixed at £1 an acre. The Canterbury Association, which bought a large quantity of land from the company, at first sold it to settlers at £3 an acre, but the price was presently reduced to £2. From 1853 to 1873 the Province of Canterbury sold 1,101,583 acres of crown lands, for which it received £2,203,166, a large part of which was spent on roads and bridges. At first the making of roads was in the hands of the Provincial Council, but in the year 1863 road districts were created, governed by boards elected by the rate-payers, and having power to levy rates for the construction and maintenance of roads. But the Provincial Council continued to spend large sums of money on certain important works, and gave, besides, large grants to the road boards.[2]

The Province of Otago and all the other provinces adopted a similar policy, and were more or less active in the construction of roads, deriving their funds from taxation, as well as from the sale of crown lands, but in the year 1876 the provincial governments were abolished, and the crown lands were taken over by the general government. From this time the construction and maintenance of roads was chiefly in the hands of the road boards, counties, and other local governing bodies, but large subsidies were granted them by the general government,

[1] Reeves, State Experiments, vol. i., chap. 6.

[2] Handbook of 1875, article by W. M. Maskell.

which also carried on important works of its own for the opening of new districts and the improvement of those already settled. From the year 1870 to March 31, 1908, the sum of £7,861,467 was expended on roads out of the Public Works Fund, and doubtless a far greater sum was spent by the various local governing bodies. Probably not less than £25,000,000 has been spent upon roads and bridges from the beginning of the colony until the present time. A large part of this amount has been procured by loans, the general government alone having borrowed over £6,000,000 for this purpose; another large part has come from the sale or leasing of crown lands; and a third part, also large, has been derived from taxation. That the development resulting from this expenditure has many times repaid the outlay is sufficiently shown by the fact that the unimproved value of land in the year 1908 was estimated at £161,324,763. Whether the benefits derived from this expenditure have been properly distributed among the people of New Zealand is another question.

The activity of the provincial governments in the building of roads was obviously due to their control over the crown lands, as well as to the fact that the settlers had not capital sufficient for enterprises of such magnitude. For the same reason, when railways were projected, the people naturally expected the provincial governments to provide the money, either from the sale of crown lands or from loans effected in England on the security of the public credit, which was largely dependent on the value of lands, public and private. Private companies, perhaps, might have been formed if the provinces had been willing to guarantee their debentures or to make large grants of public land; but there was no large supply of private capital in the colony, and no attractions sufficient to induce British capitalists to engage in what must have seemed to them small and unpromising enterprises.

The first railway in New Zealand was undertaken by the provincial government of Canterbury in the year 1860 for the purpose of connecting the town of Christchurch with the port of Lyttelton, from which it was separated by a high range of hills. At this time the total population of the colony, exclusive of Maoris, was barely 80,000, while the population of Canterbury was not over 20,000. The opening of the first part of the line, between Christchurch and Ferrymead Junction, on the Heathcote River, was celebrated with great rejoicing on December 1, 1863, and the great tunnel, a mile and a half in length, was opened on December 1, 1867. It was an important work, connecting the capital city and the interior of the province with the magnificent harbor of Lyttelton, and without it the development of the province would have been retarded for many years. A little later the province built another line, running southward from Christchurch to the Selwyn River.[1]

In 1863 the Provincial Council of Auckland began the construction of a line between Auckland and Drury, chiefly for the purpose of subduing the Maoris in the Waikato, but with the idea of ultimately completing a main trunk line to Wellington. In the same year the Provincial Council of Southland (reunited to Otago in 1870), obtained from Parliament an act authorizing the construction of the Bluff Harbor and Invercargill Railway, which was opened on February 5, 1867. To this period belongs also the Dunedin and Port Chalmers Railway, constructed by private capital under the guarantee of the Otago Provincial Council. All of these railways together were only 46 miles in length of open line in 1870, when Vogel's celebrated public works policy was promulgated. In 1872 there were only 65 miles of provincial railways; in 1875 there were only 70 miles open; and when, in 1876, the provincial governments

[1] Handbook of 1892, article by E. G. Pilcher.

were abolished and their public works were taken over by the general government the total amount spent by them on railways, including the cost of the Dunedin and Port Chalmers line, was estimated at £1,104,281, part of which was debt, and was assumed by the general government.[1]

From 1860 to 1870 the European population of New Zealand was trebled, increasing from 80,000 to 250,000, notwithstanding the almost total lack of railways. But people began to feel more and more their need in this regard. The provinces had made a good beginning, but there was no prospect of the rapid growth of their railway systems. In fact, there was no system at all, but only a few disconnected spurs issuing from the chief towns. There was a difference, too, in the gauge, Canterbury having adopted the Irish gauge of 5 feet, 6 inches, Otago and Auckland the standard English gauge of 4 feet, 8½ inches, while the government, following the advice of Robert Stephenson, recommended a gauge of 5 feet, 6 inches, but afterwards adopted 3 feet, 6 inches, as the uniform gauge for the whole colony. If the provinces had gone on with their work, it is probable that there would have been two, if not three, different gauges, with all the resulting inconvenience and loss which Australia has suffered from this cause. But the provinces, with their limited resources, could not command the capital necessary for extensive construction. It was obviously a matter for the general government to take up. The time had come for a forward movement, and it was at this favorable time that Mr. (afterwards Sir) Julius Vogel, the colonial treasurer, proposed his remarkable scheme of colonial development.

Altho the population of the colony in 1870 was only 250,000, Vogel, who was a born gambler as well as a far-seeing statesman, proposed to borrow within the next ten

[1] Handbook of 1875, article by John Knowles; Year Book of 1908, p. 579.

years the enormous sum of £10,000,000, to be expended in specified proportions on immigration, railways, roads, purchase of native lands, water races for the gold fields, and extension of telegraph works.[1] As a matter of fact, twice the proposed amount was borrowed, for the public debt within the next ten years increased from £7,841,891 to £28,185,711, while the population increased from 250,000 to 500,000, so that there was an increase in debt per capita from £32 ($155) to £56 ($272). The debt would not have been so great if Parliament had accepted the whole of Vogel's plan, for he suggested with great wisdom that the crown lands be so administered, by lease or sale, as to pay a large part of the cost of the roads and railways, and that a special tax be levied on the owners of lands specially benefited.[2] But provincial and local influence was too strong for Vogel. Parliament, after a great debate, almost unanimously agreed to the alluring proposals involving the borrowing and spending of vast sums of money, but rejected measures which were designed to operate as a check upon excessive borrowing, and would have compelled the land-owners to bear part, at least, of the burden they were so eager to shift to the shoulders of a future generation. It was no mere coincidence that Parliament was at that time largely composed of land-holders, among whom the large sheep-raisers of the South Island exercised a dominating influence. The Immigration and Public Works Act of 1870 and cognate acts were passed, and the colony entered upon a rapid career of borrowing, expenditure, and internal development.

The government had a comprehensive plan of railway construction, involving the completion and extension of lines already begun, so as to make ultimately two main

[1] Handbook of 1875, article by John Knowles; Handbook of 1892, article by E. G. Pilcher.

[2] Reeves, New Zealand, in The Story of Empire Series, p. 144; Parsons, The Story of New Zealand, chap. 18.

trunk lines running the length of both islands, with feeders into the interior wherever a profitable traffic could be developed. But the pressure of local influence was so great as to compel many deviations from the original plan. In some districts railways were built far in advance of requirements, while in others the people waited long for lines that might have been made to pay. Sir Julius Vogel desired and expected the railways to pay at least the cost of maintenance and interest on the borrowed capital (about 5½ per cent.), but from every part of the colony arose a clamor for a "fair share" in the public expenditure, and the appropriations were doled out to more than thirty different districts, with undue regard to political influence.[1] No doubt the districts having the greatest political influence were, as a rule, the most populous, but not necessarily the most promising or in greatest need of development. To such perversions of the original plan may be traced much of the financial failure in railway administration from the beginning until the present time.

The government was active in the building of railways from 1873 to 1877. In the former year there were, in all, 145 miles of open line and 434 miles under construction. In 1877 there were 1,052 miles of open line and only 251 miles under construction.[2] These were narrow-gauge lines, with severe gradients and sharp curves, light rails and cheap bridges, "designed with a view to the early production of revenue, and at some sacrifice of convenience in travelling and in working.[3] Most of these lines were built by contractors, at a cost of about £7,000 per mile.

The development of the colony which followed the inauguration of the Public Works Policy was considerable, but not so substantial as many have thought. The popu-

[1] Handbook of 1875, article from the New Zealand Times.

[2] Handbook of 1879, by James Hector, p. 81.

[3] Handbook of 1892, article by E. G. Pilcher.

lation increased by 74 per cent. in the eight years between 1871 and 1879. In the previous eight years it had increased by 62 per cent. The value of the exports did not increase much, perhaps because of the world-wide industrial depression of those years. The value of the imports increased at first, but afterwards fell. There was a great excess of imports from 1872 to 1886, and after that year a large excess of exports.[1] The value of land, especially those lands opened up by the railways, increased enormously. Sir James Hector says, "Hundreds of thousands of acres, worth, before the advent of railways, from £1 to £3 an acre, were afterwards sold at prices ranging from £10 to £20 per acre."[2] Strange to say, the provincial governments, and, after 1876, the general government, did not raise the selling price of crown lands to correspond with their enhanced market value. The Province of Canterbury, for example, continued to sell land at the old price of £2 an acre, altho immediately after the sale much of it was worth several times that amount.[3] A violent land fever or "boom" ensued, which collapsed in 1879, and from which the colony did not recover for many years. Mr. Reeves says: "The boom burst amid much suffering and repentance. In some districts three-fourths of the prominent colonists were ruined, for the price of agricultural produce continued, on the whole, to fall relentlessly year after year until 1894."[4] Mr. Reeves also says: "It was not the public borrowing of the colony, but the private debts of the colonists, which, following the extraordinary fall in the prices of their raw products between 1873 and 1895, plunged so many thousands into disaster. . . . New Zealand is now a pleasant and highly civilised country. That she

[1] Fifty Years' Progress in New Zealand; Year Book of 1908, p. 626.

[2] Handbook of 1879, p. 80.

[3] Parsons, Story of New Zealand, chap. 18; Reeves, The Long White Cloud, pp. 325–331.

[4] New Zealand, p. 148.

has become so in the last thirty years is due chiefly to the much criticised public works policy."[1]

While this is partially correct, and the crisis of 1879 was only the inevitable culmination of a period of development and inflation that began as early as 1860, it is certain that the vast and rapid expenditure of borrowed money by the government acted as a powerful stimulant to private speculation and borrowing at a time when retrenchment should have been the order of the day, and, while it postponed the coming crisis, greatly increased its violence when it did come. Besides, the unwise distribution of public expenditure, especially in the building of unprofitable railways, tended to limit the power to borrow later on for profitable investments, and thus retarded the development of the country. In the four years from 1873 to 1877, 907 miles of railway were completed, making an average of 251 miles a year. In the ten years following only 701 miles were built, in the next ten years only 304 miles, and in the ten years ending March 31, 1908, which were years of great prosperity, only 416 miles were completed, not because the colony had all the needed railways, nor because none of the projected lines could be made to pay, but chiefly because of the inability of the government to borrow adequate sums; and this may be traced to the unprofitable character of the lines already built.

The activity of the government in railway construction, and the unwillingness of the people to give concessions to private syndicates, effectually prevented private capital from engaging in railway enterprises. The Wellington and Manawatu Railway Company is a notable exception to this rule. In the year 1878 the Grey government, after careful surveys, decided to build a line between Wellington and Foxton, as an important part

[1] New Zealand. p. 150.

of the line between Wellington and New Plymouth on the way to Auckland. After about £30,000 had been spent, the work was discontinued, and a royal commission in 1880 reported against the line. Thereupon some enterprising citizens of Wellington took the matter up, and, being assured by the premier, the Hon. John Hall, that the government had no money to carry on the work, but would grant concessions, they formed a company in 1881. The initial subscribed capital was £50,000, afterwards increased to £850,000, of which £170,000 was paid up stock and £680,000 was in debentures bearing interest at 5 per cent. The work was vigorously prosecuted, and the line between Wellington and Longburn, 84¼ miles in length, was formally opened by the governor of the colony, Sir William Jervois, on November 3, 1886. By "The Railways Construction Act, 1881," Parliament made a grant of land to the company to the extent of 30 per cent. of the cost of construction, provided that this cost did not exceed £5,000 per mile. The value of land receivable under this contract amounted to £126,375. Through neglect of the government the company received land of the value of only £101,909, about 215,000 acres, some of very poor quality. It is interesting to note that the company's first issue of debentures was effected in England through Sir Julius Vogel, who acted as the first London agent of the company.[1]

The Wellington and Manawatu Railway Company has been very successful. It opened up a fine pastoral country tributary to Wellington, and sold its lands at good prices. It gave a service that compared favorably with that of the Government, and at the same rates. It diverted a good deal of traffic from the Government's line, which

[1] Annual Report of the Wellington and Manawatu Railway Company, 1906; Year Book of 1895, pp. 381 to 384.

reached Wellington by a detour of 134 miles in place of 84 miles by the Manawatu. In fact, the Government's express trains between Wellington and New Plymouth were obliged to pass over the Manawatu line. From the beginning the company has paid interest at 5 per cent. on its debentures. The first dividend, of 3½ per cent., was paid in 1891. For the two succeeding years 5 per cent. was paid, after which the dividend was 6 per cent., and latterly 7 per cent. The company also paid for all additions and improvements out of revenue, and up to 1906 had written off the sum of £202,086 on account of railway and rolling stock. From the beginning until the year 1906 the company had paid £118,550 in general and local taxes, being nearly 20 per cent. more than the original value of the land grant. The value of governmental and private lands in the district served by the railway has greatly increased, and the company claims to have been the chief cause of the creation of this "unearned increment."

For a long time the Manawatu Railway has been a thorn in the flesh to the Railways Department, and the Government has been incessantly urged to purchase the line, in accordance with the provisions of the Act of 1881, and thus complete the railway system. For lack of funds the Government has delayed doing this, but negotiations have been at last completed, and, after twelve months' notice required by the act, the Government acquired the line on December 7, 1908, the purchase price being £900,000, with additional compensation for stores and certain minor assets, the total amount paid not to exceed £930,000. This was enough to pay off the debentures and to give the shareholders something more than the market value of their shares (£2 8*s.* 6*d.*). On May 13, 1909, it was announced that they would probably receive £3 per share. The venture has proved

a good investment for the shareholders, and the government expects to make a profit on the transaction. The net earnings of the line, about £60,000, if maintained, will be sufficient to pay £40,000, the estimated interest at 4 per cent. on the new debt of £1,000,000, and to leave an annual surplus of something like £20,000. However, from this apparent surplus should be deducted over £5,000 lost in general and local taxes, besides a still larger amount spent by the company on maintenance and other general charges. Also the company had a revenue from the sale of lands, amounting to £11,388 in 1906 and £18,148 in 1908, the price received for 34,559 acres, the last of the country lands. This revenue the Government will not have, and, when all the items are deducted, the apparent surplus is reduced to very little and may be transformed into a loss, unless there is an increase in net earnings because of the rounding out of the system and the elimination of a formidable competitor.

The only other private railway of any importance was the New Zealand Midland Railway, owned by an English syndicate formed in 1886 for the purpose of building a line from Springfield in Canterbury to Brunnerton in Westland, by way of the Otira Gorge, and thence on to Nelson, a total distance of 235 miles, to complete the main trunk line of the South Island. It was a land-grant railway, and under the contract of 1888 the company was to receive 10s. worth of land along the line for every £1 spent in construction. It is stated that the government did not abide by its contract, but forced the company to sell upon unfair terms. The railway was taken over by the government on May 27, 1895, after 79 miles had been constructed at a cost of about £1,300,000.[1] The government has not yet completed

[1] Year Book of 1894, article by Norman H. M. Dalston, acting general manager; Year Book of 1896, p. 185; Year Book of 1895, p. 381.

the railway as originally planned, so that Nelson and Westland are still isolated, having no railway connection with the main lines of the South Island. At the present time there are only 29 miles of private railways in New Zealand, while 2,555 miles of line are owned and operated by the government.

Comparisons of railways in different countries are interesting, but often misleading. New Zealand has 2.4 miles of railway for every 100 square miles of territory; New South Wales, 1.1 miles; Victoria, 3.8 miles; Queensland, .47 mile; Argentina, 1.1 miles; Canada, .6 mile; the United States, 7.7 miles; Nebraska, 7.7 miles; Colorado, 5.1 miles. New Zealand is better supplied with transportation facilities than these figures indicate, for most of the large towns are on the coast, and have the benefit of transportation by sea. No part of New Zealand is as much as 100 miles from the sea, so that places that have no railways at all, but have fairly good roads, are not altogether isolated. On the whole, railway development has followed a pretty well-defined plan, and there are few parallel lines. The main trunk line between Auckland and Wellington, after years of delay, has been completed, and was formally opened on November 5 and 6, 1908. The main trunk line of the South Island is still far from completion. Travellers southward bound from Wellington take ship to Lyttelton, a distance of 175 miles, whence they can go by rail, following closely the coast line to the Bluff, at the southern end of the island. There are still a number of isolated bits of line, beginning at some seaport and ending at some small country station. Spurs run out at intervals from the main line, sometimes into a rich and populous district, sometimes into a thinly settled pastoral country, where little traffic can be developed.

The narrow gauge of 3 feet, 6 inches, prevails throughout. Originally, the railways were built with sharp curves,

steep grades, light thirty or forty pound rails, little or no ballasting, temporary bridges, small-sized rolling stock, and very inadequate terminal facilities. Gradually, the system has been improved, and at considerable expense. The railway stations at Auckland and Wellington are still very poor, but Christchurch has a good building, and the new station at Dunedin, recently built at a cost of about £46,000, is excellent. The first-class carriages compare favorably with cars of the same class in the United States. Second-class accommodation is poor. In winter the carriages are partially heated by warming-pans. Until recently there were no night trains, and, therefore, no sleeping-cars; but, since the opening of the main trunk line, sleeping accommodation has been provided between Wellington and Auckland. There are dining-cars on the principal lines, where one can obtain a fairly good meal for 2*s*.

On most of the branch lines the service is infrequent, seldom exceeding one train a day each way. There are two trains a day each way between Christchurch and Dunedin. For shorter distances, on the main lines, the service is more frequent. The large towns have good suburban service. The speed of trains is not great, particularly in hilly districts. Ordinary trains travel from ten to seventeen miles an hour; express trains, from seventeen to twenty-five miles an hour. The trains are generally on time. Accidents are relatively fewer than in the United States. In the year ending March 31, 1908, the number of employees killed was 6, being 1 in 2,056, and the number injured was 616, or 1 in 20. In the same year 8 passengers were killed, being 1 in 1,219,589 of ordinary passengers carried, and 12 passengers were injured, or 1 in 813,059.[1] In the United States, in the year ending June 30, 1906, 3,929 employees were killed, or 1 in 387; 359 passengers

[1] Railway Statement, 1908.

were killed, or 1 in 2,222,691; 76,701 employees were injured, or 1 in 20; and 10,764 passengers were injured, or 1 in 74,131.[1]

Passenger traffic is relatively large in New Zealand, yielding 33 per cent. of the total revenue as compared with 22 per cent. in the United States. It is difficult to make a comparison of fares, for there are no available statistics giving the average revenue per passenger-mile. Ordinary first-class fares average about 1½*d.* (3 cents) per mile, and second-class fares about 1*d.* (2 cents), and they are the same in every part of the system. The fares for return tickets are usually double those for single tickets. About 80 per cent. of the passengers travel second-class. There are special excursion fares for schools, factories, and friendly societies, season tickets for suburban residents and school-children, weekly workmen's tickets, special rates for tourists, and minor concessions, all of which tend to reduce the average fare. It seems probable that the average fare per passenger-mile is slightly under 1*d.* (2 cents), and, therefore, very close to the average of the United States (2.014 cents).

The railways statement does not give the average charge per ton-mile, but it may be approximately deduced by comparing the figures for 1907–08 with those of 1894–95. The commissioners in that year gave the average revenue per ton-mile as 2.04*d.* (4.08 cents), and the revenue per ton of freight carried as 79.6*d.* ($1.59). In the year 1907–08 the revenue per ton of freight carried was 78.5*d.* ($1.57), and, since there is no reason to think that the average length of the haul is much greater than it was in 1895 (*ca.* 40 miles), it is safe to say that the average charge per ton-mile is not much less than 2*d.* (4 cents), and certainly not less than 1.75*d.* (3.5 cents), making due allowance for the tonnage equivalent of the live

[1] Report of Interstate Commerce Commission, 1906.

stock carried. The ton, however, is the long ton of 2,240 pounds. In the United States, in the year 1906–07, the average revenue per ton of freight per mile was .759 cent (.379*d.*).

The system of tapering rates, involving progressively lower rates for increasing distances, is applied throughout. Goods in Class F, when shipped by the truck-load, are carried at the lowest classified rates, at a charge of .72*d.* (1.44 cents) per ton-mile for a distance of 100 miles, and .94*d.* (1.98 cents) per ton-mile for a distance of 50 miles. Goods in the next higher class, Q, are charged 1.3*d.* (2.6 cents) per ton-mile for a haul of 50 miles. Lime for fertilizing, under specified conditions, is carried free for a distance of 100 miles, but forms an insignificant part of the total freight. The rates on grain in bags are 1.16*d.* (2.32 cents) per ton-mile for 100 miles, and 1.62*d.* (3.24 cents) for a distance of 50 miles. The 50-mile rate on bituminous coal and anthracite is 1.8*d.* (3.6 cents) per ton-mile. On brown coal it is 1.3*d.* (2.6 cents). Wool in bales is carried 50 miles at a rate of 4.6*d.* (9.2 cents). Goods in Class A, including furniture, sewing-machines, fancy goods, dried fruit, glassware, spirits, sugar, and a great variety of articles of general merchandise, are carried 50 miles at a rate of 7.56*d.* (15.12 cents) per ton-mile. Rates for goods in classes B, C, and D, also, are high, being, respectively, 6.44*d.* (12.98 cents), 5.5*d.* (11 cents), and 4.18*d.* (8.36 cents) per ton-mile for a haul of 50 miles. To all of these rates must be added extra charges, when loading and unloading are done by the department. It should be noted also that most of the freight is shipped at the owner's risk.[1]

The average length of haul is probably only slightly over 40 miles, and this is one of the chief reasons why freight rates are so high, and why it is not fair to com-

[1] Passenger Fares and Coaching and Goods Rates, 1904 and 1907.

pare them with average rates in the United States, which are brought down by low charges on long-distance shipments of grain, cattle, cotton, coal, lumber, fruit, and other staple commodities. A comparison of short-distance rates would not be so unfavorable to New Zealand. Besides, the volume of business is less in New Zealand, so that the average cost to the department per ton of freight shipped is relatively high.

Both freight and passenger rates are uniform throughout the Dominion, irrespective of density of traffic. The Railways Department is no respecter of persons or places. The rates on small, disconnected lines are the same as those on the main trunk lines, and the smallest wayside station pays no more than the largest city. Beyond the published rates for carload lots, as in Class F, the largest shippers get no advantage, and there are no secret discriminations. Doubtless a system of differential rating designed to favor populous districts would prove profitable, but it would cause more discussion and criticism than any administration could stand. While making some special concessions to certain localities and for the benefit of certain industries, as timber and coal, the Department, for the most part, has taken refuge in an almost inflexible system of rates, and, instead of modifying the rates in accordance with the conditions and changes of business, has compelled business to accommodate itself to the established rates, regardless of special circumstances and special needs.

After the inauguration of the Immigration and Public Works Policy of 1870 the colonial secretary acted for a time as minister of immigration and public works. Later a special minister was appointed, and in 1872 two departments were created, and the state railways were placed under the control of the minister of public works[1].

[1] Handbook of 1875, article by John Knowles.

From the beginning the railways were run at a loss, and there was much criticism of their administration. Hence, by the Government Railways Act, 1887, they were placed in the hands of a board of commissioners, three in number, appointed for five years or during good behavior, who were expected to introduce business methods and to extinguish the deficit. The commissioners had control from January 28, 1889, to December 31, 1894, and succeeded fairly well in their attempt to place the railways upon a sound financial basis. They made themselves to a large extent independent of politics, practised unpopular economies, refused demands for concessions on every hand, and made so many enemies that, after six years of struggle, the clamor against them was so great that the commission was abolished. It is the common belief to this day, quite contrary to fact, that their administration was an egregious failure. Their greatest virtues were, in the public mind, their most heinous crimes. The commissioners were accused of being irresponsible and despotic, of caring only for their salaries, charging exorbitant rates in some cases, and in others competing unfairly with steamship companies, tram-cars and coaches, opposed to reform in administration, and, in general, of being out of touch with the people and disinclined to foster industry and encourage internal development. The proposal to abolish the commission was made an issue in the election of 1893, and after the return to power of the Seddon government the Government Railways Act, 1894, was passed. It placed the railways in the hands of the Railways Department, now separate from the Public Works Department, and this form of administration has continued until the present time.

The Public Works Department builds the railways; the Railways Department operates them. The Railways

Department is doubtless in closer touch with the public than the commissioners were or desired to be. The immediate control is in the hands of the general manager, but the power and responsibility belong to the minister, who is a member of the cabinet and has a seat in Parliament.

Since the year 1894–95 only 478 miles of line have been constructed, but much has been done in the way of improving existing lines by strengthening the road-bed, ballasting, building stronger bridges, laying heavier rails, adding more powerful engines and larger rolling stock, with Westinghouse brakes and other improvements, erecting new station buildings, double-tracking certain lines, introducing signals and interlocking systems, together with minor improvements and additions. Most of these improvements have been made with borrowed money, since the net revenues have not been sufficient to pay even interest on the capital cost. The money for such improvements must either be borrowed or paid out of taxes, for the improvements are required to keep pace with the development of the railway business. The vexed question as to charging "additions to open lines" to capital or to revenue is a question of correct accounting. If the maintenance account is sufficiently large, so that there is no depreciation, and if the improvements involve real additions to capital value, there can be no doubt that they may properly be charged to capital. It is stated that the department is particular about this matter, and when, for example, a new station replaces an old one, the cost of replacing the station as it was before is charged to maintenance, while the additional cost of the better building is charged to capital. On the other hand, the entire cost of new rails is charged to revenue. Most of the money, however, is spent for new rolling stock. Out of a total of £333,386 the sum of £243,261

was thus expended. As old rolling stock is discarded, it is written off and replaced out of revenue. A committee appointed by the Auckland Chamber of Commerce to investigate this matter reported as follows: "We are of opinion that a very substantial amount of such additions should be placed to capital account."[1] There was no account of additions to open lines under the commissioners.

Another argument in favor of charging to capital the cost of betterments is that it is desirable to show in the accounts the exact capital cost of the railways, which would not be done if expenditures beyond a reasonable maintenance were charged to revenue. Had additions to open lines since 1895 been charged to revenue, the capital cost of the open lines would now appear to be something like £20,000,000 instead of £24,000,000, and the Department would seem to be earning a higher per cent. of net revenue than it actually earns. In fact, the sum of £24,365,647, given in the accounts, is not the full cost of the railway system to the people of New Zealand. To this should be added £2,369,493, the cost of lines not yet (March 31, 1908) open, making £26,735,140 as the total capital cost upon which interest should be reckoned. But the railways have cost far more than this. Since the beginning there has always been a large sum invested in unopened lines, upon which interest had to be paid, and this must have amounted to several millions of pounds in the past thirty-eight years. There should also be added the yearly deficits, amounting to £4,256,025 since 1882, and an unknown sum before that time. If the total expenditure were reckoned from 1870 to the present time, it would be seen that New Zealand has actually paid for her railway system, in borrowed money and in taxes, not less than £35,000,000. Of this amount only £21,271,000 was paid out of borrowed

[1] The Herald, February 14, 1908.

money, and forms part of the public debt.[1] The additional cost of the railways has been paid from other sources, partly from land sales, but chiefly from taxes, direct and indirect.

Since the year 1895 the capital cost of the open lines has increased from £7,703 to £9,861 per mile of open line, largely because of the improvements above mentioned, but also because of the more difficult construction and superior character of the new lines, particularly the recently completed main trunk line. This cost seems high for a narrow-gauge road, and considerably exceeds the cost of railways of the same gauge in Queensland, Western Australia, South Australia, and Tasmania. It is about the same as the cost of the railways of the Cape of Good Hope, but much less than that of the Natal railways, which cost £15,296 per mile.[2] The New Zealand railways, particularly the newer lines, frequently run through a difficult country, where the cost of construction is necessarily high. Also railway construction is conducted on a small scale, a little at a time, and materials are expensive because of remoteness from the industrial centres of the world. Again, the Department of Public Works assists the Department of Labor in finding work for the unemployed, especially in the winter months, and a large part of the work is done by laborers working in co-operative gangs, generally with pick and shovel instead of modern machinery for excavating and grading. Such facts as these largely explain the high cost of construction. Doubtless another reason is that the work is done by a governmental department rather than by private contractors.

Because of the general prosperity of the country, to which the railways of course have contributed, the gross revenue of the system has increased from £1,150,851 in

[1] Year Book of 1908, p. 579.

[2] New Zealand Railways Statement, 1908.

1895 to £2,761,938 in 1908. The revenue per mile of line has increased from £577 to £1,114, while the revenue per train-mile has increased from 85.75*d.* to 93.75*d.* But the expenditure has increased in still greater proportion: the expenditure per mile of line from £367 to £796, the expenditure per train-mile from 63.62*d.* to 70.59*d.* The gross earnings per train-mile exceed those of all the Australian railways except Victoria, and the expenditure per train mile is greater than that of all of them, without exception.[1] Had it not been for a fall in the rate of interest on government loans since 1895, from 4.1 per cent. to 3.7 per cent., the deficit for 1907–08, figured on the basis of the "capital cost" of the open lines, would have been £184,352 instead of £89,349, as it now is.

The Railways Statement, presented annually to Parliament by the minister for railways, does not recognize the existence of a deficit, but shows a "net profit on working," so called, without noting that it is always insufficient to pay interest on the cost of construction at the average rate of interest paid by the government on the public debt. In the year ending March 31, 1908, the railways earned a "net profit" of 3.33 per cent. on £24,365,647, the cost of construction of the open lines, but, since the average rate of interest paid on the public debt was about 3.7 per cent., the "net profit" is absorbed in interest payments, and a deficit emerges, amounting to £89,349, if interest is reckoned on the cost of the open lines only. But the real cost of construction of the railway system, on which interest should be reckoned, includes the cost of the unopened lines, making a total of £26,735,140, reducing the "net profit" to 3.04 per cent. and increasing the deficit to £177,021. This is considerably less than the deficits during the administration of the commissioners, which, in their turn, were less than those of their prede-

[1] Railways Statement, 1908, Return No. 15.

cessors, but, as shown above, the reduction has been chiefly due to a fall in the rate of interest, with which the railway administration as such has had nothing to do. Reckoning interest on the cost of the open lines only, as in the table, the total deficit from 1895 to 1908 amounts to £1,134,447; from 1882 to 1908 it is £4,256,025 ($20,000,000). Taking interest on the cost of the unopened lines as well, the deficit is increased by at least 50 per cent.

Year.	Miles Open.	Capital Cost of Open Lines.[1]	Average Rate of Interest on Public Debt.[2]	Interest on Capital Cost.	Revenue.		Expenditure.			"Net Profits on Working."		Deficit.
					Total Revenue.	Revenue per Train-mile.	Amount.	Per Train-mile.	Per Cent. of Revenue.	Amount.	Per Cent. of Capital Cost.	
1881–82 . . .	1319	£9,443,000	4.8%	£453,264	£892,026	85.50*d.*	£523,099	50*d.*	58%	£368,927	3.9%	£84,337
1882–83 . . .	1358	10,478,998	4.8	492,991	953,347	82.00	592,821	51	62	360,526	3.4	132,465
1883–84 . . .	1396	11,078,500	4.8	531,768	961,304	81.00	655,990	55	68	305,314	2.7	226,454
1884–85 . . .	1477	11,810,194	4.7	555,079	1,045,712	87.00	690,026	57	66	355,686	3.0	199,393
1885–86 . . .	1613	12,427,814	4.7	584,107	1,047,419	83.00	690,340	54	66	357,079	2.9	227,028
1886–87 . . .	1727	13,017,567	4.7	611,825	998,768	79.50	699,072	56	70	299,696	2.3	312,129
1887–88 . . .	1758	13,352,978	4.6	614,236	994,843	81.00	687,328	56	69	307,515	2.3	306,721
1888–89 . . .	1777	13,472,837	4.6	619,740	997,615	85.50	647,045	55	65	350,570	2.6	312,170
1889–90 . . .	1809	13,899,955	4.6	623,397	1,095,570	91.50	682,787	57	62	412,783	2.9	210,614
1890–91 . . .	1842	14,278,586	4.5	642,536	1,121,701	93.00	700,703	58	62	420,998	2.9	221,538
1891–92 . . .	1869	14,656,691	4.6	674,207	1,115,432	88.75	706,517	56	63	408,915	2.8	265,292
1892–93 . . .	1886	14,733,120	4.3	633,524	1,181,522	94.50	734,142	59	62	449,380	3.0	184,044
1893–94 . . .	1948	15,137,036	4.4	666,029	1,172,793	90.25	735,359	57	63	437,434	2.9	228,595
1894–95 . . .	1993	15,352,613	4.1	629,459	1,150,851	85.75	732,160	55	66	418,691	2.7	210,768
1895–96 . . .	2014	15,425,532	3.9	599,795	1,183,041	85.75	751,368	55	64	431,673	2.8	168,122
1896–97 . . .	2018	15,577,392	3.9	608,518	1,286,158	90.50	789,054	56	61	497,101	3.2	111,417
1897–98 . . .	2055	15,993,903	3.9	623,762	1,376,008	90.00	857,191	56	62	518,817	3.2	104,945
1898–99 . . .	2090	16,404,076	3.8	623,355	1,469,665	89.00	929,738	56	63	539,927	3.2	84,428
1899–1900 . .	2104	16,703,887	3.8	634,847	1,623,891	93.00	1,052,358	60	65	571,533	3.4	63,314
1900–01 . . .	2212	17,207,328	3.8	653,878	1,727,236	89.75	1,127,848	59	65	599,388	3.5	55,490
1901–02 . . .	2235	18,170,722	3.8	690,487	1,874,586	88.95	1,250,237	59	67	622,349	3.4	66,138
1902–03 . . .	2291	19,081,735	3.8	706,022	1,974,038	87.00	1,343,415	59	68	630,623	3.3	75,399
1903–04 . . .	2328	20,692,911	3.8	787,130	2,180,641	91.75	1,438,724	60	66	741,917	3.6	45,213
1904–05 . . .	2374	21,701,572	3.7	804,958	2,209,231	86.50	1,492,900	58	68	716,331	3.3	86,627
1905–06 . . .	2406	22,498,972	3.8	854,960	2,349,704	87.75	1,621,239	60	69	728,465	3.2	126,495
1906–07 . . .	2456	23,504,272	3.7	869,658	2,624,600	93.00	1,812,482	64	69	812,118	3.4	57,540
1907–08 . . .	2471	24,365,647	3.7	901,528	2,761,938	93.75	1,949,759	66	71	812,179	3.3	89,349
												£4,256,125

[1] If interest were reckoned on the capital cost of open and unopened lines, as it should be, the annual deficits would be much greater than the amount shown in the table. For the year 1907–08 the capital cost of open and unopened lines was £26,735,140.

[2] The average rate of interest on the public debt is less than the rate actually paid on the sums realised by the government from the sale of stock. At the present time 4 per cent. stock is floated at about par, and therefore it would be more correct to take 4 per cent. as the rate of interest on the railway debt. Reckoning interest at 4 per cent. on the cost of open and unopened lines the deficit for 1907–8 would be £257,226, and the total deficit since 1881–82 would probably be at least £8,000,000 and possibly £10,000,000.

In explanation of the deficit it should be said that some of the lines, chiefly those in the North Island, earn more than 3.7 per cent. upon the capital cost, and that the bulk of the deficit proceeds from losses on the Hurunui-Bluff section, the main trunk line of the South Island, 1,283 miles in length, of which the net earnings in 1907–08 were only 2.39 per cent. This is the oldest part of the system, being the continuation and linking up of lines begun by the Provinces of Canterbury and Otago. It is probable that the political influence of the South Island, greater formerly than at present, had much to do with the unprofitable railway construction in that part of New Zealand. In the year 1907–08 the revenue per mile on the Hurunui-Bluff section was only £946, while the revenue on the Wellington-Napier-New Plymouth section was £1,600 per mile, and on the Auckland section it was £1,112 per mile. The expenditure per mile was £723 on the Hurunui-Bluff section, £1,085 on the Wellington section, and £756 on the Auckland section. The revenue per train-mile on these three sections was 93.25*d.*, 85.5*d.*, and 90.5*d.*, and the expenditure per train-mile 71.3*d.*, 57.7*d.*, and 61.5*d.*, respectively.[1] Sir Joseph Ward, in a recent speech in Parliament, thus explained the losses on the railway system of the South Island: "In the South Island the haulage to the ports is over comparatively short distances, and competitive rates are in existence in some places, owing to sea competition. On the Wellington-Napier-New Plymouth Section and the Auckland Section the haulage is longer, there is little sea competition, and the lines are newer in comparison with the southern ones. Age brings its troubles to railways as well as to individuals. The pioneer lines have had to be brought up to standard require-

[1] Railways Statement, 1908, Returns 4 and 6. See also various pamphlets by Samuel Vaile.

ments to meet the demands of the business by repairs, additions to structures, bridges and station accommodations. As the North Island lines increase in age they will require more expenditure on repairs than at the present moment, and they will then go through the same process that the southern lines have. . . . When you get anything like the proportion of railway mileage in the North that exists in the South, you will have a very much larger capital invested and very much larger sections over which haulage will go, and the earnings of the whole of the railways in the North will require to be greater than they are now in order to maintain either the present gross or net returns. The disproportion between the revenue and the expenditure will, as the years go on, become equally as marked in the North Island as the honorable member has said it is now in the South Island."[1]

If this is true, the financial prospects of the New Zealand railways are discouraging, and Mr. Vaile and other critics must be largely right in claiming that either "additions to open lines" should be charged to revenue, or there should be a large allowance for depreciation, since the earning power of the whole system is likely to decline as the years go by. But the allowance for maintenance of way and works, as Sir Joseph Ward himself has shown,[2] is already high, and it is increasing year by year. In 1895 it was £141 per mile of line; in 1908 it was £258, and one would think that this should be sufficient to keep the system in good condition without any allowance for depreciation. In the Railways Statement for 1908 it is stated: "The increased cost of maintenance is very largely due to the policy of betterment that has been followed during the past few years. . . . The lines are in excellent condition, and, in view of the important functions that

[1] New Zealand Parliamentary Debates, vol. 139, p. 664. July 26, 1907.

[2] Auckland Star, February 17, 1908.

they perform in the development of settlement and commerce of the Dominion, it is essential that the present high standard be maintained."[1]

Another explanation of the deficit that is given by the Government is that great concessions have been given to the public in fares, freights, and train services, and to the railway employees in wages and salaries. Speaking, apparently, of the period between 1895 and 1907, Sir Joseph Ward said: "The concessions given to the public in the matter of fares and freights amounted to £850,000, and the value of the increased train services to £883,000. . . . This takes no account of the concessions in pay given to the railway staff, which amounted to another £375,000."[2]

Undoubtedly, wages and salaries have been slightly increased from time to time, to keep pace in a measure with the general increase in wages and cost of living in New Zealand and throughout the world, and this has caused an increase in expenditure, offset, however, by increased revenue, due to the general prosperity of the country. But such increases can hardly be regarded as voluntary "concessions," or gifts, since even now the railway employees, if one may believe the Amalgamated Society of Railway Servants, and their organ, the Railway Review,[3] are receiving wages rather less than those paid in private employ, while their hours of labor are frequently much higher than would be tolerated in any private business subject to the jurisdiction of the Arbitration Court. There are only thirty-one officials who receive salaries of £400 ($2,000) or more. The general manager receives a salary of £1,250 ($6,200), the chief engineer £900, the chief traffic manager £800, the traffic

[1] Railways Statement, 1908, p. vi. [2] Auckland Star, February 17, 1908.

[3] The New Zealand Railway Review, a journal devoted to the interests of the New Zealand railway men.

superintendent £650, the chief clerk £500.[1] The most highly paid station master, a man who has been in the service for forty years, receives only £355 ($1,720). Station masters receive from £170 ($730) to £355, ordinary clerks from £170 to £300, cadets from £40 to £100, guards from 8*s.* ($2) to 10*s.* ($2.50) a day, enginemen from 10*s.* 6*d.* ($2.60) to 12*s.* ($3) a day, firemen from 7*s.* 6*d.* ($1.85) to 9*s.* ($2.25), carpenters from 9*s.* to 10*s.* 6*d.*, blacksmiths from 10*s.* to 12*s.*, common laborers generally 7*s.* ($1.75) a day.[2] Salaries and wages are now slightly higher than they were in 1907, but there is no evidence to show that any material concessions have been made to railway employees. However, they have the advantage of regularity of employment and of retiring allowances under the superannuation system.[3]

It is equally difficult to see how it can be claimed that any such sum as £883,000 can have been returned to the public in the form of increased train services. The business of the railways has greatly increased, necessitating an increase in train service, but this can hardly be regarded as a gift, since the public presumably pays for what it thus receives, unless the train service is in excess of what the traffic requires. Doubtless unreasonable concessions are constantly demanded by the public, and the department sometimes gives way, but that such concessions can have amounted to the enormous sum above mentioned it is hard to believe.

There is more ground for the statement that concessions have been made in fares and freights, altho it seems as tho the department had greatly overestimated the value of these concessions also. In the year 1895 the average charge per ton of freight carried, exclusive of cattle and

[1] Members of the Railway Department, 1907.

[2] Members of the Railway Department, 1907.

[3] Government Railways Act, 1908.

sheep, was £.333; in 1900 it was £.315; in 1908 it was £.327. These figures do not indicate any great reductions in freights, unless there has been in the same time a considerable increase in the length of haul. In 1895 the average charge per ordinary passenger carried was £.092; in 1896 it was £.068; in 1901 it was £.080; in 1908 it was £.085. Here, again, it is possible that the average distance travelled by each passenger may have increased, and that the charge per passenger-mile may have fallen more than the charge per passenger carried.[1] These figures take no account of considerable reductions in fares for season tickets, designed to develop suburban and tourist traffic, nor of school excursion fares and other minor concessions.

But it is a question how far reductions in fares and freights are to be regarded as "concessions," since they appear to have been for the most part justified from a business point of view by the increase in traffic which they have helped to develop. In 1895 only 2,048,391 tons of freight were carried, exclusive of cattle and sheep; in 1908 4,834,534 tons were carried. In 1895 there were 3,905,578 ordinary passengers; in 1908 there were 9,756,-716.[2] Sir Joseph Ward has frequently said that it would be very easy to extinguish the deficit by increasing railway charges, and that, if required, as much as 10 per cent. could be earned upon the capital cost.[3] It is a question, however, whether the Department is not already, in most places, charging all that the traffic can bear, and whether a reduction in rates would not be more productive of net revenue than an increase. Passenger traffic, as is well known, is very responsive to changes in rates. To increase charges on cattle and sheep might cause owners to drive them to market instead of sending them by rail, and even

[1] Railways Statement, 1908, Returns Nos. 5 and 16.

[2] Railways Statement, 1908.

[3] The Auckland Star, February 17, 1908.

a slight increase in rates between points on the seacoast would cause a considerable falling off in traffic. As Sir Joseph Ward also said, in a recent speech at Carterton, "If rates were increased, it would mean that the revenue would be reduced, there would be fewer trains, and a number of hands would be dismissed."[1]

As to the claim that net profits of 10 per cent. could be earned by merely increasing charges, it can hardly have been seriously made. The gross earnings in 1908 were not much more than 10 per cent. upon the capital cost, and to produce a net revenue of 10 per cent. it would be necessary to increase the gross revenue, and presumably the fares and freights, by at least 60 per cent., assuming that the traffic and expenditure would remain the same. But such an increase in rates would cause a sharp falling off in traffic, and instead of producing a net revenue of 10 per cent. would probably cause the deficit to increase and greatly injure the country at large. If the Department could increase the charges in certain districts and lower them in others, according to the amount and character of the traffic, it would probably be possible to secure a considerable increase in net revenue, but this would be adopting the practise of differential rating, for which the commissioners were execrated, and which would cause a storm of protest and complaint, with charges of favoritism and the like, such as no democratic government could resist.

The chief causes, then, of the railway deficit, appear to be the following:—

1. The construction of lines in advance of requirements.

2. The high cost of all lines.

3. Delays in the construction of lines that might be profitable, due chiefly to lack of funds.

4. A high cost of maintenance and operation, partly

[1] The Wellington Evening Post, November 5 and 12, 1908.

due to a certain lack of discipline, initiative, and effectiveness in the railway service. This will be disputed, and is hard to prove.

5. A rigid system of rates.

6. Unprofitable concessions in service, fares, and freights.

One of the most serious causes of inefficiency and dissatisfaction is the system of promotion. Men are usually promoted merely because their names come first on the list of seniority, unless it can be proved that they are actually incapable, which is difficult. The theoretical right to advance capable men over their seniors is practically never exercised, because of the unpleasantness and difficulty of proving alleged unfitness. Until a system of promotion by merit is introduced, there will never be an efficient service. Yet promotion by merit lends itself readily to favoritism and other abuses. Again, members of the service, even cadets, frequently have political influence back of them, and this interferes seriously with discipline. Also workers in the government shops have frequently been accused of practising the "government stroke." The general manager himself, Mr. T. Ronayne, recently wrote a strong letter to the chief mechanical engineer at the Addington workshops, making serious charges of inefficiency. However, when the commission appointed to investigate the charges met at Christchurch on March 11, 1909, the general manager said that he had been misinformed and that he was perfectly satisfied with the condition of the workshops. Yet in the course of the investigation certain significant facts were brought out, such as the difficulty of getting rid of inefficient men, the difficulty of getting good men when needed, the lack of encouragement to inventors and other good men by promotion and advances in salary, and the lack of up-to-date appliances in certain lines of work.[1]

[1] The Wellington Evening Post, January 20 to March 17, 1909.

For these and other causes the New Zealand railways have never earned the full amount of interest on their capital cost. But the Government has frequently declared that it does not wish to make the railways pay. In the Railways Statement for 1905 Sir Joseph Ward says, "The policy of the Government has been throughout to regard the railways as adjuncts to the settlement of the country, and to look upon the earning of a large profit as of minor importance compared with the incalculable benefits that accrue to the State by giving the settlers a convenient and cheap means of transporting the produce of their farms to the markets, and any surpluses which have accrued after the payment of the minimum of 3 per cent. on the capital cost of the lines have been returned to the users of the railways in cheapened freights and increased facilities." More recently Sir Joseph Ward is reported to have said: "The Government has laid down definitely in regard to our railways the policy of returning to the users of the railways all earnings over 3 per cent. That is a clean-cut issue, for which the Government must accept full responsibility."[1] Just why 3 per cent. should be preferred to 3.74 per cent., the average rate of interest now paid upon government loans, or why it would not be as well to earn only 2 per cent., it is difficult to say. But it is not hard to understand how it came to be thought that the railways should be operated primarily for development rather than for profit.

New Zealand was, and is, a new country, with large undeveloped resources, and the people of every district desire roads and railways as a means to one end,—development. To the land-owner, development means enhanced prices for land; to the merchant and manufacturer it means an expanded market for their goods; to the laborer it means high wages, steady employment, and

[1] New Zealand Times, February 17, 1908.

opportunities for advancement, particularly while the developmental works are going on. It was inevitable, then, that emphasis should be laid upon development, social service, and all the present and prospective benefits of public works, rather than upon considerations of cost, which would have operated as a check upon public expenditure, and would have retarded to some extent the speed of economic development. Besides, it was not necessary to pay cash down: it was possible to borrow, and thus shift the burden of cost upon the shoulders of future generations, which would presumably be well able to bear it. Moreover, it was thought by some, notably Sir Julius Vogel, that the railways would sooner or later pay many times over all the cost of construction and all the losses and deficits of their early years.

Hence the people in every part of the country demanded railways, formed associations for the purpose of securing them, elected members to Parliament pledged to do their utmost to that end, and the Government, unable to resist the pressure of public opinion, borrowed as much as it could, and built short, unprofitable bits of line without counting the cost. The land-owners as a class, who were the strongest political force in the colony, were naturally the most eager to have railways built, loudest in their demand for low rates, most intense in their scorn of base commercialism in railway management. The railways might never pay expenses, not to speak of interest on the capital cost, much less contribute to the liquidation of the public debt, but land values would increase, and they themselves would gain in "unearned increments" far more than they had lost in additional taxation.

The question at bottom is one of social utility *versus* social cost, and it must be said that, on the whole, New Zealand has gained more than it has lost by the build-

ing of railways. But it would have gained more and lost less if the people and the Government had laid more stress upon the idea of cost, and had in every case bent their efforts towards securing a maximum of benefit at a minimum of cost. Social benefit and social cost are vague concepts, hard to measure; but they can be measured with some exactness by means of money, and the financial measuring-rod must be applied to them if the people wish to know whether a governmental undertaking is socially advantageous or not. In the case of the school system the cost can be measured, but not the product, for this is non-material, and has no definite market value; and this is the cause, too, of much of the inefficiency that characterizes the school system. But, in the case of railways it is quite possible to measure benefit as well as cost, and to strike a balance of profit or loss in terms of money. If this is not done, there is no exact standard of efficiency and no measure of social benefit other than the vague surmise of some one who thinks that a given undertaking was well worth all it cost.

A district that cannot supply enough traffic to make a railway pay, sooner or later, should not have a railway at all; and if, in spite of the prospective loss, the railway is built, it becomes a parasitic enterprise, drawing sustenance from other parts of the country, which receive no direct benefit and cannot afford to pay for indirect benefits, since they all have their own burdens to bear. Similarly, it is neither economical nor just to make concessions in railway rates or railway service, and cause the resulting deficit to fall upon the tax-payers, unless the tax-payers, in the not too remote future, are going to get their money back. If all the users of the railways are tax-payers, it is a matter of indifference to them whether they pay more taxes or higher rates. For the

sake of sound finance they should pay higher rates. But, if some tax-payers are not, directly or indirectly, users of the railways, then the policy of gratuitous concessions involves making people who do not enjoy the benefits of railway transportation pay for those who do, and who, moreover, are well able to pay for them themselves.

It is said that the country must be developed. But it is neither necessary nor possible to build railways everywhere, and quite possible to spend more in the development of a district than that district deserves or than the country at large can afford.[1] Every district claims what it calls a "fair share" of public expenditure, but can allege no principle of fairness in the distribution of railway expenditure other than the prospect of developing a large population, large wealth, and a profitable traffic. It is not reasonable to expect a new line to pay from the very first, but long-established lines ought to pay, and pay enough to recoup the government for all the losses of earlier years. The idea of making the railways a profitable investment ought ever to be kept in mind as a check upon extravagant expenditure and a guide to further extension. If this is not the test

[1] The case of the Lawrence-Roxburgh Railway is a glaring instance of the waste of public money. It was a political railway, commenced by Seddon during an election four years ago. Since that time many thousands of pounds have been spent, miles of embankment laid out, and some tunnels started, but not a mile of line opened. Of this line Mr. John MacGregor, himself a citizen of Dunedin, says, "The Lawrence line was generally admitted, at the time of its construction, to be a gross political job, but, in spite of that fact, leading citizens of Dunedin defended and even advocated it, just as they are now advocating the extension to Roxburgh, and on the same ground,—the advantage of Dunedin." Mr. MacGregor quotes from a recent speech of one of the Otago members, who said: "For himself, what he desired was to see that Otago got its fair share of the public expenditure. It mattered little to him where the money went so long as that object was secured." (The Evening Post, July 10, 1907, article by John MacGregor.) Quite recently the Government has stopped all work on this line because of lack of funds and because it is not likely that the line will pay. (Evening Post, April 10, 1909.) A great outcry has been raised by the people of Dunedin and the settlers along the projected line, and doubtless the settlers have a serious grievance, but the action of the Government is generally commended in other parts of the Dominion.

of fairness in railway construction, service, and charges, then there is no test other than political influence and the granting of concessions to purchase votes,—a practise that has done great harm in the past and will greatly retard the future development of the Dominion unless the government sternly sets its face against the political control of railways and towards the establishment of sound financial principles in every part of the administration.

Indeed, the financial failure of the railways has been one of the chief causes of the slow growth of railways during the past thirty years. From 1873 to 1878 nearly 1,000 miles of line were built, an average of about 200 miles a year; but in the thirty years from 1878 to 1908 only 1,385 miles were built, an average of only 45 miles a year. This average would be fairly high if the railway system were practically complete and only a few minor extensions had to be made from time to time. But such is not the case. A section of the main trunk line between Auckland and Wellington, about 200 miles in length, has taken twenty-three years to build, altho it was the most important link in the whole system, and promised to develop a large and profitable traffic. "Apart from the fact that this dilatory method of construction has added enormously to the cost, it is appalling to think of the huge sum which the Dominion has paid in interest during construction, to say nothing of the returns which might have been gathered in and the settlement which would have been promoted, had the work been completed with reasonable dispatch." [1]

The causes of this delay and loss have been chiefly two. In the first place, the funds available for railway construction have been distributed, not to say frittered away, in various parts of the country, in the building of small

[1] The Press, Christchurch, September 23, 1908.

bits of line, instead of being concentrated on one or two important works. This was largely due to political considerations. Secondly, the funds at the disposal of the government were limited, because the government could not advantageously borrow more than a certain amount every year, altho much larger sums were urgently required. If the railways already built had been paying investments, earning the full interest on the capital cost, and, perhaps, a surplus to apply to betterments, a considerable sum now borrowed for "additions to open lines" would have been available for new construction, and it would have been easy to borrow all the money needed for projected lines if only they promised, in their turn, to become paying investments. Thus the districts already supplied with railways, by their narrow and selfish policy, have not only compelled the people who had no railways to contribute to the deficit, but have for years prevented these people from getting railways in districts that could be developed and could supply a profitable traffic.[1]

The present Government is aware of these facts, and notwithstanding its own statements to the contrary, which must be regarded as dictated by political expediency, it does desire to make the railways pay. Hitherto public opinion has not been educated up to the point where it would sustain the Government in trying to apply commercial principles to railway management. But, largely because of the keen financial criticism of such men as Mr. Samuel Vaile, of Auckland, supported by the opposition in Parliament and a considerable section of the press,—a criticism severe, perhaps, at times, but salutary,—public opinion is changing, and would now probably support the Government in trying to make the railways a financial success. What Mr. Victor Clark says of Aus-

[1] The Evening Post, November 13, 1908.

tralia, "The bad economy of building non-paying lines is now well understood," [1] is coming to be true of New Zealand also, and doubtless in the near future the bad economy of non-paying operation, of all sorts of unprofitable concessions, will be equally well understood.

The Government is in a difficult situation. Here an undeveloped district is crying for a railway, there a rich and prosperous population is clamoring for concessions of every kind. On the one hand, the railway servants demand higher wages and shorter hours; on the other, the Department of Labor asks that railway construction be made subordinate to the provision of work for the unemployed. And yet the financial critics expect the railways to pay interest on the capital cost and earn a surplus for "additions to open lines."

Nevertheless, the government is taking a stronger attitude than formerly. Intrenched behind a large parliamentary majority and supported by the criticisms of the opposition, it can afford to refuse the demands of nine-tenths of the petitioners, to accede to which would be to plunge the Dominion into hopeless bankruptcy. Sir Joseph Ward, in a recent speech in the House, made a most effective charge of inconsistency against those members who, in one breath, condemn the Government for extravagant expenditure and, in the next, ask favors of all kinds for their constituencies. He said: "What is the use of any one indulging in what is nothing more or less than colossal hypocrisy, in urging that the Government should keep down the expenditure of loan money, in proclaiming that we have obtained too much loan money, when every honourable member knows that ever since the beginning of the session the Order Paper has been crowded every day with questions asking for new railways, asking for new public buildings, asking for in-

[1] Quarterly Journal of Economics, 1908.

creases in salaries and increases in wages of public employees, asking for concessions in getting some of the public utilities services at less than cost price? They are asking for all these things from all parts of the Colony, and then they are talking to their constituencies in the direction of saying that the Government is living on borrowed money. The whole pretence of declaiming against borrowing money and at the same time appealing in other directions for large sums to be expended out of borrowed money is really political hypocrisy."[1]

Notwithstanding the large financial losses of the railways, practically nobody in New Zealand proposes private ownership as a remedy. The railways could probably be sold for a sum at least equal to their capital cost, and it is probable that a private company could so operate the lines as to pay interest on the cost of purchase, taxes on its property, and moderate but increasing dividends on its stock. From a merely financial point of view it would probably pay to sell the railways to a private company, which, like the railway companies of the United States and Canada, would do much to develop the varied resources of the country. Or the railways might be leased to a private company, as provided for in the Act,[2] and in this way the Government might have the burden of interest on the railway debt taken off its hands, and receive in addition a considerable rent for the monopoly which the lessee would receive.

But no such proposal would find favor in New Zealand. Sir George Grey once said in the House, "If we were to sell our railways, we should deal as great a blow at the future prosperity of New Zealand as it would be possible for our greatest enemies to achieve." Even Mr. Vaile is a strong believer in government ownership, and says

[1] Parliamentary Debates, vol. 139, p. 622. July 24, 1907.

[2] An Act to consolidate and amend the Law relating to the Maintenance and Management of Government Railways, 64 Vict., 1900, Sect. 34.

of his own criticism of the railway administration, "It has been anything but pleasant work for me to write as I have done, for I feel that my exposure of the utter failure of the system in this country will be used against me and I fear that an agitation will arise for the sale of our lines."[1] It would be highly presumptuous in the present writers to say that New Zealanders are wrong in this regard, for, while the sale of the railways to a private company would probably yield good financial returns and further rather than retard the development of the country, the creation of a great monopolistic corporation might introduce a source of corruption new to New Zealand political life, and for this reason, if for no other, the people of the Dominion may well rather bear the ills they have than fly to others that they know not of.

Already there appears to be a strong tendency toward improvement in the railway administration, through the efforts of the Department itself, encouraged by wholesome criticism and suggestion from without.[2] One of the most interesting suggestions has originated with Mr. Vaile, who has for years devoted much time and thought to railway problems. Mr. Vaile invented the "stage system" of railway rates, in 1882, some years before the introduction of the well-known "zone system" of Hungary. Mr. Vaile's system, however, is the reverse of the Hungarian, which gives better rates to urban than to rural districts, and thus furthers the concentration of population in cities. Mr. Vaile considers that the chief object of railway administration should be to prevent this concentration by distributing population and placing people upon the land. He would accomplish this end by making railway rates in rural districts very low and in urban districts relatively high. The country served

[1] New Zealand Railway Administration, by S. Vaile. Auckland, 1906.

[2] Railway Reform, a series of articles in the Evening Post by A. G. Stephens, beginning January 9, 1909, ending March 3.

by any railway would be divided into stages, short stages in thickly settled districts and long stages in the country, and the fares and freight charges would be the same for any stage, long or short. For example, the second-class passenger fare for a stage of 6 miles, from Auckland to Penrose, would be 4*d.* (8 cents, or 1.3 cents per mile), while for the same fare one could travel from Frankton to Te Kuiti, a distance of 41 miles, making only .1*d.* (.2 cent) per passenger-mile. In less-settled districts one might even travel 50 miles for the same fare of 4*d.* The chief effects of this system, as enumerated by Mr. Vaile, would be the distribution of population, the creation of inland trade, a great increase in land values, and a large increase in railway revenue. Apparently, Mr. Vaile does not sufficiently consider the limits to the development of rural traffic and the financial loss which the Department would suffer if it had to carry a small traffic at such exceedingly low rates. New Zealand has not yet suffered much from congestion of population in great cities, but Mr. Vaile's suggestions as to the distribution of population may yet have to be considered, especially in more highly developed industrial countries, where the growth of enormous cities constitutes a serious menace to the future welfare of the human race.[1]

Again, it is proposed that the railways be once more placed in the hands of a commission of experts, who, to a large extent independent of political control, may administer the system in a business-like way. The commission that had charge of the railways from 1889 to the end of 1894 has frequently been accused of despotism and inefficiency, but in reality its administration compares very favorably with that which preceded it, and the country gained little or nothing by reverting to direct

[1] Railways and Social Conditions, Auckland, 1904; Social Problems, Auckland, 1899; The Railway Problem, Auckland, 1908; and various other pamphlets by Samuel Vaile.

parliamentary control. The general prosperity of New Zealand and of the world, since 1894, together with the fall in the rate of interest on New Zealand loans, has largely obscured the bad effects of political influence. But they have existed, nevertheless. Certainly, the Australian States, notably Victoria and New South Wales, seem to have benefited greatly by the introduction of the commission form of railway administration. A commission is not, and cannot be, wholly removed from political influence, but it is one step further away from that source of demoralization than a governmental department, with a cabinet minister at its head. A commission can be a good deal more independent than a general manager who derives all of his power from the minister. The chief objections to a commission are that it is too independent, perhaps even despotic, not sufficiently in touch with the people and their needs, too conservative in policy, and liable to all the abuses characteristic of governmental bureaus,—abuses which it is very hard to eradicate.[1] No doubt, the development of the civil service in every country shows a strong tendency towards a rigidity of system, which, like the induration of the arteries in the human body, is a sign of age rather than of youth and vigor, involving a lack of elasticity and adaptability to environment, inevitable, perhaps, but not to be taken as an indication of real progress.

But the prospects of improvement in railway affairs are encouraging. After years of delay the main trunk line of the North Island has been finished, the successful Manawatu line has been purchased, the Government has determined upon a policy of concentration in railway construction, and, best of all, there has been a gratifying change of opinion with regard to the bad economy of building unprofitable lines and the equally bad economy

[1] Vaile, The Future Control of our Railways, Auckland, 1893; Parsons, Story of New Zealand, chap. 31.

of making unprofitable concessions at the expense of the tax-payers and those who have waited long for railways that never come. The new minister for railways, the Hon. J. A. Millar, has definitely abandoned the 3 per cent. policy, and stated in reply to a deputation asking for lower rates that the railways should at least pay interest, and that he did not believe in making the tax-payers pay for the users of the railways.[1] Then, too, the Dominion is rapidly increasing in population and wealth, so that, unless the government goes into the construction of extensive unprofitable lines, the deficit should soon disappear, and there should be a surplus to apply, if not to the reduction of the debt, at least to improving the open lines.

It cannot be sound policy for a country like New Zealand, where the Government does so many things, to allow governmental enterprises to be carried on at a loss. Other countries can afford the luxury of deficits in the postal service and the like, because they merely play at governmental ownership, but to adopt this policy on a large scale would be to start upon the downward path that leads to ruin. Governmental property pays no taxes, and, when there is a deficit, it must fall, sooner or later, upon the tax-payer. Thus, with every extension of governmental activity, taxes would increase, while property subject to taxation would relatively decrease, and the burden would grow until it could no longer be borne. Then it would be clearly seen that the principles of sound private and public finance are essentially the same, and that a profit on public undertakings, the difference between revenue and expenditure, stands for a balance or excess of social utility over social cost.

JAMES EDWARD LE ROSSIGNOL.
WILLIAM DOWNIE STEWART.

[1] Evening Post, January 26, 1909.

THE DECLINE IN THE RATIO OF BANKING CAPITAL TO LIABILITIES.

SUMMARY.

I. The decline has taken place, for the national banks, by abrupt drops in periods of business revival, with steadiness in intervening periods, 697.—Has extended to all classes of banks, 698.—Due proximately to rapid increase of deposits, with stationary capital, 699.—II. The main cause has been an increase of lawful money supplied to the banks by the general public, 703.—III. The same tendency appears in the English banks, the Canadian banks, the State banks, 708.—IV. The decline not necessarily an indication of weakness, 712.

I.

Critics of the national banks have often called attention to the fact that the ratio of capital to total liabilities has fallen. But seemingly no one has noticed the curious way in which this fall has occurred. Practically, the whole decline of the ratio has taken place in two periods of rapid recovery from severe business depression,—1878–80 and 1896–99. Table I. presents the facts succinctly. "Capital liabilities" includes capital, surplus, and undivided profits. The ratios for each year are averages of the ratios computed from the reports made to the Comptroller of the Currency,—four a year from 1864 to 1869, five since 1870. For 1909 only two reports are now available.

TABLE I.

Ratio of Capital Liabilities to Total Liabilities of the National Banks, 1864–1909.

Years.	Ratios.	Years.	Ratios.	Years.	Ratios.	Years.	Ratios.	Years.	Ratios.
1864	35%	1874	36%	1884	32%	1894	29%	1904	20%
1865	33	1875	37	1885	31	1895	29	1905	19
1866	33	1876	38	1886	31	1896	30	1906	19
1867	34	1877	37	1887	31	1897	27	1907	19
1868	35	1878	36	1888	31	1898	24	1908	19
1869	36	1879	32	1889	30	1899	21	1909	18
870	37	1880	30	1890	31	1900	20		
871	35	1881	28	1891	32	1901	19		
872	36	1882	29	1892	29	1902	20		
1873	37	1883	30	1893	31	1903	21		

SUMMARY.

	Lowest Ratio.	Highest Ratio.	Average Ratio.
1864 to 1878	33%	38%	36%
1880 to 1896	28	32	30
1899 to 1908	19	21	20

The striking feature of this series of figures is not the drop in 1878–80 and again in 1896–99, but the relative steadiness of the ratios from 1864 to 1878, from 1880 to 1896, and from 1899 to 1908. Within each of these periods the extreme range of the ratios is less than the fall from one period to the next. Further, the lowest ratio of each period is higher than the highest ratio of the succeeding period. These differences between the three periods of relatively steady ratios would be still more striking if the figures for the first four years, when the national banking system was in process of formation, were omitted. Through years of established prosperity, through years of panic, and through years of depression the capital of the national banks has expanded or contracted in proportion with changes in the volume of their liabilities to the public. But in periods of transition from prolonged business stagnation to business activity capital has fallen rapidly behind, and in after-years has never regained its former proportion. Recovery from minor crises, such as occurred in 1884 and 1903, has been attended by changes similar in kind, but slight in degree.

Closer examination shows that this change has extended to all of the classes into which the national banks are divided by the legal provisions regarding minimum reserves (Table II.).[1]

[1] This table is based upon only one report for each year because the Comptroller publishes summaries for the reserve city and country banks of the autumnal reports alone. But the variations in the ratio between different reports for the same year are so slight as to make the lack of fuller data of little moment.

TABLE II.

RATIO OF CAPITAL LIABILITIES TO TOTAL LIABILITIES IN THE VARIOUS CLASSES OF NATIONAL BANKS, 1878 AND 1880, 1896 AND 1899.[1]

	All National Banks.	Country Banks.	Reserve City Banks.	Boston, Philadelphia, and Baltimore Banks.	New York City Banks.
October 1, 1878 . .	35%	42%	33%	34%	20%
October 1, 1880 . .	30	37	25	29	17
	5%	5%	8%	5%	3%

	All National Banks.	Country Banks.	Reserve City Banks.	Central Reserve City Banks.	New York City Banks.
October 6, 1896 . .	30%	35%	29%	21%	19%
September 7, 1899 .	21	27	18	12	11
	9%	8%	11%	9%	8%

At the beginning of both periods, in 1878 and in 1896, the city banks had a decidedly lower ratio of capital to total liabilities than the country banks. But, nevertheless, the decline in the ratio during both periods was greater in the reserve cities than in the country. In New York, on the contrary, the decline was smaller than in the country in 1878–80, and the same as that in the country in 1896–99.

Since the change occurred among national banks of all classes, its cause may be sought in the Comptroller's summaries of the "Aggregate Resources and Liabilities of the National Banks." Tables III. and IV. are based upon these summaries of the autumn reports of 1878 and 1880, 1896 and 1899. To facilitate comparisons, the Comptroller's statements have been condensed by combining similar items.

Both tables show that the chief cause of the decline in the ratio of capital to total liabilities was an extremely rapid increase of deposits at times when capital was stationary

[1] Computed from tables in the Reports of the Comptroller of the Currency: 1878, p. v; 1880, p. iv; 1896, p. 561; 1899, p. 419.

or declining. In the earlier period of business revival (1878–80) deposits increased more than $300 millions, while capital did not change: in the later period (1896–99) deposits increased more than $1,400 millions, while capital actually declined $29 millions. In comparison with the vast increase of deposits, the changes in liabilities for notes and for miscellaneous items were almost negligible. Of course, the rapid growth of deposits swelled the total liabilities, so that the proportion borne to this total by the stationary or declining capital became rapidly less.

TABLE III.

SUMMARY OF THE CONDITION OF ALL NATIONAL BANKS, OCTOBER 1, 1878, AND OCTOBER 1, 1880.

	Actual Figures Millions of Dollars.			Relative Figures Percentages of Total Assets and Liabilities.		
	1878.	1880.	Changes.	1878.	1880.	Changes.
Capital, surplus, profits	624	624	—	35.3%	29.6%	—5.7%
National bank notes	302	317	+ 15	17.1	15.1	—2.0
Deposits	833	1,157	+324	47.2	55.0	+7.8
Other liabilities	8	8	—	.4	.3	— .1
Total	1,767	2,106	+339	100.0%	100.0%	
Loans and discounts	834	1,041	+207	47.2%	49.4%	+2.2%
United States bonds and premiums	449	405	— 44	25.4	19.3	—6.1
Other bonds and stocks	37	49	+ 12	2.1	2.3	+ .2
Due from other banks	139	213	+ 74	7.9	10.1	+ 2.2
Exchanges, checks, and cash items	93	134	+ 41	5.3	6.3	+ 1.0
Lawful money	128	174	+ 46	7.1	8.3	+ 1.2
Other assets	87	90	+ 3	5.0	4.3	— .7
Total	1,767	2,106	+339	100.0%	100.0%	
Analysis of deposits:						
Individual deposits	623	878	+255	35.3%	41.7%	+6.4%
United States deposits,	45	11	— 34	2.6	.6	—2.0
Bank deposits	165	268	+103	9.3	12.7	+3.4
Gross deposits	833	1,157	+324	47.2	55.0%	+7.8%
Net deposits	601	810	+209			

TABLE IV.

SUMMARY OF THE CONDITION OF ALL NATIONAL BANKS, OCTOBER 6, 1896, AND SEPTEMBER 7, 1899.

	Actual Figures Millions of Dollars.			Relative Figures Percentages of Total Assets and Liabilities.		
	1896.	1899.	Changes.	1896.	1899.	Changes.
Capital, surplus, profits	985	956	— 29	30.2%	20.5%	— 9.7%
National bank notes	210	200	— 10	6.4	4.3	— 2.1
Deposits	2,030	3,460	+1,430	62.2	74.5	+12.3
Other liabilities	39	34	— 5	1.2	.7	— .5
Total	3,264	4,650	+1,386	100.0%	100.0%	
Loans and discounts	1,893	2,516	+ 623	58.0%	54.1%	— 3.9%
United States bonds and premiums	280	348	+ 68	8.6	7.4	— 1.2
Other bonds and stocks	189	320	+ 131	5.8	6.9	+ 1.1
Due from other banks	332	686	+ 354	10.1	14.8	+ 4.7
Exchanges, checks, and cash items	91	172	+ 81	2.8	3.7	+ .9
Lawful money	343	466	+ 123	10.6	10.1	— .5
Other assets	136	142	+ 6	4.1	3.0	— 1.1
	3,264	4,650	+1,386	100.0%	100.0%	
Analysis of deposits:						
Individual deposits	1,600	2,452	+ 852	49.1%	52.8%	+ 3.7%
United States deposits,	15	79	+ 64	.4	1.7	+ 1.3
Bank deposits	415	929	+ 514	12.7	20.0	+ 7.3
Gross deposits	2,030	3,460	+1,430	62.2%	74.5%	+12.3
Net deposits	1,607	2,602	+ 995			

Periods of depression and periods of established prosperity present a sharp contrast to these periods of business revival, in that capital and demand liabilities rise or fall together instead of moving in opposite directions. Between 1899 and 1907 capital rose $675 millions and deposits rose $2,616 millions;[1] between 1892 and 1896 capital fell $42 millions and deposits fell $284 millions; between 1880 and 1892 capital rose $403 millions and deposits rose $1,157 millions; between 1866 and 1873 capital rose $571 millions, deposits rose $656 millions, and notes, then of greater relative importance, rose $294 millions. In only one period which can be confidently contrasted with our two periods of business revival did capital and deposits fail to coincide in the direction of their movements. This

[1] All of these comparisons are based upon tables like Tables III. and IV. for the fourth of the five reports made yearly to the Comptroller.

one period is 1873 to 1878. During it capital fell $42 millions and deposits rose $20 millions. But the whole of this gain of deposits, and more, was due to an increase of deposits by the United States and its disbursing officers amounting to $29 millions, and brought about by Secretary Sherman's refunding operations. Moreover, notes, which then as in the earliest period stood more nearly on a par with deposits, fell $37 millions. These years of panic and depression therefore make no real exception to the rule.

II.

This contrast between periods of business revival, on the one hand, and periods of depression or prosperity, on the other hand, presents two problems. Why does not capital increase promptly when business revives, and what is the source of the great increase of deposits?

An answer to the first question is given by the Comptroller's figures for the average net earnings of the national banks (Table V.).

TABLE V.

RATIO OF THE NET EARNINGS OF ALL NATIONAL BANKS TO CAPITAL AND SURPLUS: BY YEARS, 1870–1908.[1]

Years ending March 1.	Ratios.	Years ending March 1.	Ratios.	Years ending March 1.	Ratios.	Years ending March 1.	Ratios.
1870	11.8%	1880	6.7%	1890	8.6%	1900	8.2%
1871	10.4	1881	8.4	1891	8.9	1901	10.0
1872	10.2	1882	9.5	1892	7.8	1902	10.5
1873	10.7	1883	8.6	1893	7.4	1903	10.1
1874	10.3	1884	8.6	1894	5.6	1904	10.4
1875	9.5	1885	6.9	1895	5.0	1905	9.0
1876	8.1	1886	7.3	1896	5.4	1906	9.5
1877	6.3	1887	8.5	1897	5.4	1907	12.3
1878	5.3	1888	8.8	1898	5.2	1908	9.1
1879	4.8	1889	8.7	1899	5.8		

[1] Report of the Comptroller of the Currency, 1908, p. 228. The ratios are not averages of similar figures for each national bank, but the quotients obtained by dividing the aggregate net earnings of all banks by their aggregate capital and surplus. The Comptroller gives 16.4 per cent. for 1907, explaining that this ratio covers four extra months, March to June, 1907. I have therefore subtracted one-quarter from this ratio to make the figure comparable with that for other years. I assume that the figure for 1908 covers July 1, 1907, to June 30, 1908.

SUMMARY.

Years ending March 1.	*Average Ratios.*
1870–74	10.7%
1875–80	6.8
1881–93	8.3
1894–99	5.4
1900–08	9.9

Both in the seventies and in the nineties the years preceding the fall of the ratio were years of low net earnings, which discouraged the investment of capital in the banking business. Few new banks were established; some old banks went bankrupt; others went into voluntary liquidation; still others remained in business, but reduced their capital. After the panic of 1873 the number of national banks continued to grow until June 30, 1876; but then the number fell from 2,091 to 2,048 on October 2, 1879. Meanwhile the average capital, surplus, and undivided profits of the banks in business declined from $324,000 to $298,000. After the panic of 1893 the loss of numbers began more promptly and became much greater. May 4, 1893, the number stood 3,830. From that point there was an almost unbroken fall to 3,579 on February 4, 1899. Between these dates the average capital liabilities were reduced from $272,000 to $263,000.

But these reports of October 2, 1879, and February 4, 1899, which show the lowest points touched by capital liabilities, are not the reports which show the lowest ratios of capital to total liabilities. For, tho capital began to increase again, its growth was slow for some time. And the table of net earnings explains that fact. Revival of business activity may be dated from the autumn of 1879 in the earlier case and from the autumn of 1897 in the later. But net earnings did not rise to the moderately profitable level of 8 per cent. until the twelve months ending March 1 of 1881 and 1900, respectively. These records seem to put banking among the trades which recover slowly from business depression. That banking should be slow in attracting new investments of capital is therefore to be expected.

The source of the great increase of deposits is not so

simple a matter to determine as it may seem. For deposits may be augmented not only by an inflow of actual cash from individual customers, from public and private corporations, or from other banks, but they may also be augmented by the lending of deposit credits and the deposit of checks drawn against such credits. It is, therefore, necessary to scrutinize the changes in the deposit, loan, and cash accounts somewhat closely.

Table III. shows that deposits increased $324 millions between October 1 of 1878 and of 1880. But from this gross amount there should be deducted two items which represent duplications,—the $74 millions of increase in sums due from other banks and the $41 millions of increase in exchanges for the clearing house, checks, and cash items.[1] There remains a net increase in deposits of $209 millions. Since the increase in loans was $207 millions, it may be thought that the growth of deposits during this period of business revival was due almost wholly to freer lending of deposit credits, and hardly at all to an inflow of funds from customers. But there is a further question: How were the banks enabled to increase their loans of deposit credits? To expand deposit credits by lending ordinarily requires an expansion of lawful money reserves. In fact, the banks increased their holdings of lawful money at a slightly faster pace than their deposits grew, for the proportion of reserve against net deposits, computed as above, rose from 21.3 per cent. to 21.5 per cent. The additional $46 millions of reserve money did not come from the stockholders, for there was no increase of capital, surplus, and profits. It did not come from sales of bank property, for, tho the banks sold $44 millions of United States bonds, they had to pay back $34 millions of United States deposits, and they increased their holdings of other bonds and stocks and of

[1] A portion of the latter sums belongs in the accounts of banks other than national. The estimate of increase in net deposits which results is, therefore, conservative. The method of computing net deposits followed here differs from that of the Comptroller in that (1) United States deposits are included, (2) sums due from reserve agents are treated like other sums due from banks, and (3) that bills of other national banks are left out of account.

miscellaneous property by $15 millions. It must therefore have come from depositors. In other words, the increase of deposits was brought about by an increase of money supplied to the banks by the general public. This increase of money then became the basis for a further increase of deposits through larger loans.

The later case is far more striking. Net deposits increased $995 millions, of which we may assign $64 millions to the United States, $160 millions to banks other than national, and $771 millions to individual depositors. Meanwhile the gain in loans was $623 millions, or $372 millions less than the gain in net deposits. Once, again, this gain in loans was itself ultimately due to increased deposits of lawful money. For of the $123 millions gain in reserve, not a dollar was provided by the stockholders or by sale of other bank property. On the contrary, the stockholders withdrew $29 millions of their capital, and at the same time put $205 millions additional into the United States or other bonds and stocks and into miscellaneous investments. So freely, indeed, did the banks use the increased funds put at their disposal by the public in withdrawing capital, buying securities, and extending loans, that they reduced the proportion of their reserve from 21.2 per cent. of net deposits to 17.9 per cent.

In this second period the fall in the ratio of capital to total liabilities was considerably greater than in the first period of business revival. The summary of Table I. shows a drop of six points in this ratio between the averages for 1864–78 and 1880–96, and a drop of ten points between the averages for 1880–96 and 1899–1908. Table III. makes the drop 5.7 points, Table IV. 9.7. Part of the difference is due to the fact that capital remained stable from 1878–80, and government deposits decreased, while in 1896–99 capital fell and government deposits increased. But, if we alter the figures for the later period to correspond with those of the earlier period in these respects,—that is, if we take capital in 1899 the same as in 1896, and government deposits less than in 1896 by three-quarters,—the ratio of capital to

total liabilities is raised only to 21.4 per cent., and the drop in the ratio still remains considerably greater than in 1878–80—8.8 as against 5.7 points. The remaining difference is due to the more rapid growth of deposits at the later period.[1]

This increased deposit of money in the banks is shown from another side by the Comptroller's figures for the distribution of money between the banks and the public. Between the 1st of July, 1896 and 1899, the treasury released about $8 millions of the sums it had been hoarding.[2] There was also an increase of about $390 millions in the total stock of money in the country. Thus the banks and the public had about $398 millions of additional money to divide between themselves. In 1896 the public held 65 per cent. of all money outside of the treasury, and the banks held 35 per cent. But, as the stock increased, the division between the public and the banks altered in favor of the latter, so that on July 1, 1899, they held 38 per cent. against 62 per cent. for the public.[3]

In times of business revival, then, the great increase of national bank deposits has been brought about by the actual deposit of more money in the banks. The business public has supplied the banks with funds, which the banks have employed to increase their profits. In part they have treated the additional funds as reserves against which they have lent larger deposit credits, thus increasing deposits still further; in part they have bought more interest-bearing securities; in part they have distributed funds to stock-

[1] Probably some connection exists between this faster growth of deposits and the fall in the ratio of reserve from 21.2 per cent. in 1896 to 17.9 per cent. in 1899, for in 1878–80 this ratio increased from 21.3 to 21.5 per cent. But much stress cannot be laid upon this difference between the periods, since the increase of loans was much greater in comparison with deposits in 1878–80. Even if the gain in other bonds and stocks be added to the gain in loans as a source of deposit credits, the difference between the two periods is but little reduced.

[2] See F. W. Taussig, "The United States Treasury in 1894–96," Quarterly Journal of Economics, January, 1899.

[3] The Comptroller has not introduced into these figures the revision made by the Director of the Mint in his estimate of the stock of gold. Were this change made, the share of the banks would be 38 per cent. in 1896 and 40 per cent. in 1899. Similar statistics are not available for 1878–80.

holders, thus reducing their capital. These changes have all conduced towards increasing the percentage of net earnings by increasing the actual income or by decreasing the capital upon which the percentage is computed. The result has been that the low earnings of years of depression have been raised once more to attractive figures. Then stockholders have again begun to provide from their own pockets the additional funds required by expanding business, and the fall in the ratio of capital to total liabilities has been checked.

The United States seems now to be entering upon another period of business revival, similar to the revivals of 1878–80 and 1896–99. Will another decline in the ratio of capital to liabilities take place? All the experience summarized in Table I. suggests that it will. Indeed, a slight decline has already occurred, as the following figures for the successive reports to the Comptroller since the summer of 1907 show:

Date of Report.		*Ratio.*
1907.	August 22	19.4%
	December 3	19.6
1908.	February 14	19.6
	May 14	19.4
	July 15	19.1
	September 23	18.7
	November 27	18.5
1909.	February 5	18.4
	April 28	18.5

But, apart from the fact that the ratio is already on a lower level than in 1896, there is reason for expecting any further change to be small in comparison with the ten point drop of the later nineties. If the depression following the panic of 1907 is already over, it must rank as a disturbance of business conditions far less protracted than the disturbances following the panics of 1893 and 1873. So far the capital of the national banks has not been diminished. Only the rapidity of its growth has been checked, and that but slightly. Whatever change occurs, therefore, seems likely

to be caused solely by the growth of deposit or note liabilities, without the contributory influence of falling capital.

III.

Neither the decline in the ratio of banking capital to liabilities, nor the occurrence of this decline in periods of returning prosperity, is peculiar to the national banks. Table VI. shows that similar changes have taken place in three other important groups of banks.[1] The English joint-stock banks, which had a much lower ratio in the seventies; the Canadian banks, which had a much higher ratio; and the State banks, which had, approximately, the same ratio,—all, like the national banks, have failed to increase their capital in proportion to the growth of their total liabilities.

[1] The figures for the American State banks cannot be carried back of 1873, for that was the first year the Comptroller of the Currency was authorised to call upon State officials for reports. These data, moreover, are less satisfactory than those for the national banks in that they refer to but one day of the year—about the 1st of July—and in that not all institutions of the class are represented. The Canadian data are based upon annual averages of the monthly reports made to the Minister of Finance. These reports do not show the undivided profits of the banks. Accordingly, the aggregate liabilities to stockholders have been computed by subtracting the liabilities to others from the total assets. The English data are derived from the tabular statement published by the London Economist in October of each year, beginning with 1877. The Bank of England is omitted, and the returns for 1877 are not used because of the relative incompleteness of the Economist's first attempt to compile a summary for all joint-stock banks.

TABLE VI.

RATIO OF CAPITAL LIABILITIES TO TOTAL LIABILITIES OF THE NATIONAL BANKS, THE STATE BANKS, THE CANADIAN BANKS, AND THE JOINT-STOCK BANKS OF ENGLAND AND WALES.

Data from the Reports of the Comptroller of the Currency, the Canadian Year Book, and the London Economist.

Years.	National Banks.	State Banks.	Canadian Banks.	English Banks.
1868	35%	—	44%	—
1869	36	—	41	—
1870	37	—	36	—
1871	35	—	36	—
1872	36	—	39	—
1873	37	31%	40	—
1874	36	31	38	—
1875	37	28	44	—
1876	38	35	46	—
1877	37	35	45	—
1878	36	41	46	15%
1879	32	40	44	16
1880	30	33	39	16
1881	28	29	37	16
1882	29	28	34	16
1883	30	27	36	17
1884	32	30	38	16
1885	31	30	37	16
1886	31	28	36	16
1887	31	28	35	16
1888	31	32	33	15
1889	30	29	32	15
1890	31	30	32	15
1891	32	32	30	15
1892	29	31	29	15
1893	31	31	28	15
1894	29	32	28	15
1895	29	31	27	13
1896	30	30	28	12
1897	27	29	26	12
1898	24	25	24	12
1899	21	21	23	12
1900	20	21	22	12
1901	19	19	21	12
1902	20	19	20	12
1903	21	20	21	12
1904	20	20	20	12
1905	19	19	19	12
1906	19	18	19	11
1907	19	18	19	11
1908	19	18	19	11
1909	18			

SUMMARY.

	Average Ratios by Periods.		
	To 1878.	1880–96.	1899–1908.
National banks	36%	30%	20%
State banks	34	30	19
Canadian banks	41	33	20
English banks	—	15	12

The summary shows, further, that the decline in the ratios for these other groups of banks can be forced to fit into the periods marked off by the record of the national banks. For our own State banks these periods fit well. Independent examination of their ratios would suggest 1878–81 and 1896–99 as the years of shifting to permanently lower levels. The chief differences between the movements for the State and national banks is found in the less steady State-bank ratios during periods of depression and periods of prosperity. But this difference is trifling for 1881–96 and for 1899–08. It is marked only for 1873–78, and may be due to imperfections in the earlier returns.

The English ratios, on the other hand, suggest a division into somewhat different periods, divided from one another by changes much slighter than have occurred among the American banks because the ratios have long been so much lower in England. The first change came between 1887 and 1888. England suffered a far more severe business depression in 1884–86 than the United States,—a depression so severe that a Royal Commission was issued to inquire into the depression of trade and industry. Accordingly, the years 1887 and 1888 had much more the character of a business revival than with us. It is, therefore, rather a confirmation than a contradiction of inferences from the record of the national banks to find the English ratio dropping slightly at a time when the American ratio was nearly stable. A second and greater fall occurred in 1894–96. Aside from the less degree of change, the sole difference from American experience is that the fall began two years earlier in England. But this difference also is in strict accordance with expectations based upon the previous study, for trade revived in England after the crisis of 1890 earlier than trade revived in the United States after the crisis of 1893. Finally, the English ratio fell one point more in 1905–06, when the country was recovering from the hard times which followed the Boer War.

The Canadian ratios, likewise, show certain divergencies from those for the United States, but divergencies which

seem to be connected with the course of business cycles. In 1867 the failure of the Commercial Bank was followed by runs upon other banks, by restriction of credit accommodation in the busy autumn season, and by commercial stagnation.[1] Next year a period of great activity began, and in 1868–70 the ratio of capital to total liabilities fell from 44 per cent. to 36 per cent. However, there followed a substantial recovery in the ratio in 1871–76,—a recovery which finds no parallel in the other groups of banks. Changes in business conditions, in banking legislation, and in banking competition, seem to account for the alteration. The banks began to apply the brake to the over-rapid progress of business as early as 1872. In 1873 there was no panic, and severe stringency did not begin until 1875. Meanwhile the legislature began in 1871, to insert in new bank charters a clause providing that, if $100,000 of the capital were not certified as paid within one year, the charter should be forfeited for non-user. Finally, the banks were engaged in a competitive struggle to increase their capitals and "rests." Part of the large gain in capital which resulted was fictitious according to Mr. Breckenridge, being represented by loans upon the security of shares in other banks or by advances to a bank's own stockholders.[2]

After 1876 the Canadian ratios pursue a course similar in character to the others represented in Table V. A shift to a permanently lower level came in 1878–81, and a second slighter drop in 1887–93, when the movement in Canada seems to stand half-way between that in the United States and in England. There was again stability during the hard times of 1893–96, and another fall during the business revival of 1896–1900. Since then the Canadian ratios have been almost exactly the same as those for the national banks.

[1] R. M. Breckenridge, The Canadian Banking System, pp. 185–191.

[2] Pages 266–270.

IV.

Whether the decline which has occurred so generally in the proportion of bank funds supplied by the stockholders seriously weakens the banks is a question to which two answers are given. Dr. Frederick A. Cleveland, for example, one of the best-equipped critics of the national banking system, holds that the stockholders should furnish their banks with sufficient funds to provide office equipment and an adequate money reserve; that is, sufficient money to meet demands for payment on all the credit which the bank is able to sell. He compares a bank which relies for reserve upon money deposited with it by customers to "a railroad that is carrying a part of its construction on floating debt, or a manufacturer who has supplied himself with machinery by means of demand loans." And he estimated in January, 1908, that his rule would require the addition of not far from $500,000,000 to the capital of national banks.[1]

The material which has been presented, however, need not lead to such conclusions as Dr. Cleveland draws. Our city banks have a record quite as good as that of our country banks, and yet Table II. shows them to have a much smaller ratio of capital to total liabilities. The English joint-stock banks have not, like our banks, been compelled to suspend payments twice in fifteen years, and yet their ratios have long been far less than ours. It is also a striking fact that the decline in the ratios has occurred chiefly in those very periods when confidence in the banks and in business conditions has been increasing and partly because of that very increase of confidence. The question of the strength and elasticity of banking systems is a question of the reserves carried in proportion to deposits, of the perfection of organization which enables the banks to make the most effective use of these reserves, and of the sagacity of banking practise in keeping assets liquid and acting boldly in the face

[1] F. A. Cleveland, The Bank and the Treasury. New edition, 1908. Introduction, pp. xix and xxviii.

of crises. If the banks of the United States, Canada, or England, are weaker now than in the seventies,—which is by no means sure,—the cause must be sought in a decline of reserves not offset by higher organization or more sagacious practise. Adequate treatment of this large subject would require far more space than is available here. But the opinion may be ventured that the decline in the ratio of capital to total liabilities is not an element of danger unless it is accompanied by changes for the worse in some one of the respects mentioned.

On the contrary, it may be suggested that the inpour of millions of customers' money at times of business revival promotes the recovery out of which it grows. For a heavy increase of deposits on which no interest or a low interest is paid gives the banks a basis for far larger loans than they could otherwise make. Competition between them for the available business prevents interest rates from rising so rapidly as they would if the stockholders themselves had to provide the whole increase of funds. And the fact that there is seldom a recurrence to the old ratio of capital to liabilities during the subsequent years of prosperity means that the banks, with their larger proportion of depositors' money, are able to do more business with the same capital investment. From this standpoint the change means a more efficient utilization of the community's current funds.

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NOTES AND MEMORANDA.

A PROBLEM IN DEFERRED PAYMENTS AND THE TABULAR STANDARD.

The intended purpose of a tabular standard for deferred contracts is to shield both borrowers and lenders from losses due to unforeseen changes in the value of the money unit. The ideal is that contracting parties should, in general, be able to count on receiving or paying back with interest an equivalent amount, or purchasing power over an equivalent amount, of certain goods.

Any individual lender might feel satisfied to get back an equivalent amount, plus interest, of the particular goods he wished to use. But if in the mean time those goods increased in value compared to others, he would be more than equally well off. Even tho the goods in question were the ones it was his original intention to use, the fact that for them he can now purchase a larger amount of other goods than formerly may induce him to exchange part of them for these other goods when without the relative change in values he would not have done so. In that case he has gained by this change. So a borrower, if he were to pay back an equivalent amount of certain goods, plus interest, and if these goods appreciated in value relative to the goods he was engaged in producing, so that he had to pay back, measured in the latter, a considerably larger amount than he borrowed, would be a loser by the shifting of relative values. The ideal, then, has been to include in the index number expressing the general price level different elements, so that what would be returned (in contracts based on a tabular standard) would be purchasing power over an equivalent amount of goods in general.

It is therefore impossible to assume that repayment should be equivalence of purchasing power over any one thing

or any small group of things. But there might be some question whether there should be repaid purchasing power over an equivalent amount of capital, of investment goods, or purchasing power over an equivalent amount of income services, an equivalent amount of consumption goods. The form of index number will be different according as we adopt the one or the other standard or a standard between the two. In the one case we should make our index number for the price level of any year by comparing the prices of each kind of existing capital, for some point of time in that year, with the prices for the corresponding point in the year selected as a standard. Then we should take an average of these ratios, weighting each ratio by the existing value, at the standard year price,[1] of that kind of capital, the value *at* an *instant* of time. In the other case we should construct our index number from the prices of goods consumed *during* the years compared, weighting each price ratio by the value, at the standard year price, of that kind of goods consumed *during* a *period* of time, probably the year of which the price level was desired. It can easily be seen that, at least in theory, there may be a marked difference in the results likely to be reached by these two methods, and that either one may cause unforeseen injury to those whose special circumstances are better adapted to the other.

Let us first consider capital as a standard, repayment to be in purchasing power over an equivalent amount of capital, with interest. Let us assume a contract to be made, between a borrower and a lender, on this basis. If, then, before the time of repayment the rate of interest rises, the value of durable capital will fall as compared to the value of services and the more consumable forms of wealth, since the value of any article is the discounted value of its future earnings or of its future services. Then to settle the contract by

[1] See Walsh, The Measurement of General Exchange-Value, p. 541, and the references there given. This weighting by the quantity in the given year times the price of the standard year is followed also by Professor Irving Fisher in The Rôle of Capital in Economic Theory (Economic Journal, December, 1897, vol. 7, pp. 516 and 517), and the most complete defense of it is to be found in Professor Fisher's unpublished lectures.

repaying an equivalent purchasing power over durable capital would be to settle it by repaying less than an equivalent purchasing power over consumption goods. The borrower would have gained and the lender would have lost. Certainly, a borrower who had contracted the loan for the sake of immediate consumption might be regarded as having profited by the change in relative values. On the other hand, a lender who, had he not made the loan, would have spent the amount in enjoyment, is a loser. These relative positions of borrower and lender are reversed if, instead of rising, the rate of interest falls.

Let us next assume the income standard, repayment being made in an amount of income services and consumable goods equivalent to that borrowed plus interest. If, then, the rate of interest rises during the period of contract, the value of durable capital (its future services being discounted less) will be higher in comparison to the value of these services and the value of consumption goods. Consequently, repayment of the same purchasing power over income (*e.g.*, in the form of services, such as shelter, and consumable goods) means repayment of a less purchasing power over capital in such forms as factories and machinery. Hence the borrower, if the purpose of his borrowing was to invest in these forms of capital, is a gainer, since he repays less (not allowing for interest) than he borrowed. The difference is his own. Obviously, what the borrower gains, the lender, if lending is with him an alternative not to consuming, but to investing, loses. He might have invested in a factory, enjoyed the interest, and still at the end of the period had the same factory. By lending, he gets back an equivalent purchasing power over consumption goods, but not an equivalent purchasing power over capital. If we assume that during the period of the contract the rate of interest falls instead of rising, then the borrower will lose and the lender will gain.

The borrower is not necessarily or even usually a spendthrift. He does not necessarily borrow as an alternative to going without present gratifications, but may borrow as an

alternative to missing a business opportunity. He may borrow, for example, to buy durable capital instead of consumption goods. Hence the assumption that he should pay back an equivalent of consumption goods, whether or no he pays back an equivalent of production capital, is unjustified. On the other hand, the lender is not necessarily a person who, except for the stimulus of the loan contract, would have been a spender. He is a man of three options, not merely of two. He has a choice of spending for immediate pleasure, of investing for remote returns, or of lending. If lending were an alternative merely of spending for immediate gratifications, it might seem that a proper tabular standard would return him an equivalent amount, with interest, of purchasing power over such gratifications. But since lending may be instead an alternative to investing, it might equally well be claimed that the lender should get back purchasing power, with interest, over an amount of capital equivalent to what he might have invested in at the start, had he not made loans. It is true that enjoyment is the aim of all economic effort, but this enjoyment may be intended for a later date than the termination of the loan contract. A tabular standard to be applied by both borrower and lender in the large majority of loan contracts should therefore take account of all the alternatives open to all parties, and should accordingly be based on both durable capital goods and income or consumption goods.

The problem of how to include both capital and consumption goods or income in the same index number and give each a proper weighting is in theory insoluble. Capital and income are not commensurable terms. Capital is a stock existing at a point of time, while income is a flow through a period of time.[1] How long a period shall we consider in reckoning the values of the consumable goods equivalent in weight for our index number with the value of capital existing at an instant of time? Shall the value of a railroad be given an importance in the general average equivalent to the value of wheat consumed in a month or six months

[1] See Irving Fisher, The Nature of Capital and Income, p. 52.

or a year? If the money value of the railroad has doubled, while that of theatre tickets has tripled, how shall we determine the importance in the general average to be given to each? The only solution of the difficulty is really not a solution. It is to weight the price change of each kind of goods in proportion neither to an existing stock nor to consumption during any period, but in proportion to the value of the *exchanges* of that kind of goods during a period,—as, for example, a year. This form of index number is a practical compromise between the two suggested standards of capital and income. It is, furthermore, the form of index number which grows logically out of the equation of monetary circulation.[1]

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TAX REFORM IN WASHINGTON: THE EXEMPTION OF INTANGIBLES.

The Washington State Board of Tax Commissioners was organized in the summer of 1905 under the authority of a law passed at the legislative session of that year. As a permanent board, it was given comprehensive powers of investigation and supervision. It was especially directed to make a careful study of the revenue systems of other states and countries, so far as that could be done by correspondence and the examination of reports and statistics, and to report to the governor any changes in the revenue laws of the State that might seem desirable. The board quickly demonstrated the need of its services, and an effort in the legislative session of 1909 to secure its abolition was readily defeated.

Tho one of the youngest of American commonwealths,

[1] See Irving Fisher, Review of Walsh on The Measurement of General Exchange-Value, in Yale Review, xi. iii. (May, 1902).

Washington is firmly bound by its constitution to the general property tax. It is, accordingly, from this source that most of its revenue is derived, tho something is gained from "indirect" taxes, such as privilege and license taxes, and from the inheritance tax. The constitution stands squarely in the way of any comprehensive reform, requiring the taxation of practically all property in the State at a uniform rate. Provision is made for the deduction of debts from credits, and for the exemption of governmental property "and such other property as the legislature may by general laws provide." This last clause, however, seems to apply to the exemption of property used for public or quasi-public purposes, such as that of educational, charitable, and religious institutions, rather than to the exemption of special forms of property. The legislature is specifically given power to grant exemption of personal property, under certain circumstances, to the amount of $300. In general, however, the constitutional provisions are rigid. All property must be taxed, and it must be taxed at a uniform rate.

In their first biennial report the Commissioners made a number of important recommendations. The partial acceptance of these in regard to the State depositary laws, the taxation of express, private car, and insurance companies, and licenses, was followed by an increase in the revenue from these sources of $315,628.83.[1] The acceptance of the recommendation that the assessment of railroads be placed in the hands of the Tax Commissioners, together with a physical valuation of most of the steam railroads by the State Railroad Commission, resulted in the raising of the assessment from $44,109,495 in 1906 to $84,619,342 in 1908.[2]

That the general property tax, as applied to moneys and credits, was ineffective and a source of gross injustice, was a point on which the Commissioners were well agreed. Concerning the remedy, there was such a difference of opinion as to lead to a separate statement from each of the

[1] State Board of Tax Commissioners. Second Biennial Report, p. 15.

[2] *Loc. cit.*, p. 19.

Commissioners. Two of these, however, are so well in accord that they may be regarded as a majority report. These members held that moneys and credits, like all other property not used for public or quasi-public purposes, should be taxed; but that it should be taxed at a moderate rate. To so tax them was, of course, unconstitutional, and the majority of the board recommended that there be submitted to the people a constitutional amendment that would permit this reform and such others as might seem desirable. The third member of the board recommended the total exemption of such property from taxation.

As regards the injustice and ineffectiveness of the general property tax, little need be said. The experience of Washington is not essentially different from that of other states. In the main, intangible property has escaped, tho the tax has been paid by the very conscientious and by those who are not able to make use of the ordinary means of evasion. According to the assessment of 1906, the last in which a thorough-going attempt seems to have been made to list all property of this sort, the total amount listed was:[1]—

Moneys and credits of banks, bankers, brokers, etc. . .	$4,857,482
Moneys on hand or on deposit	3,151,452
Notes, accounts, tax certificates, warrants, and other credits	3,016,960
Bonds, stocks, and shares	709,030
Total intangibles	$11,734,924
Total personal property	82,151,507
Total property, real and personal	530,209,882

In the opinion of the Board of Tax Commissioners, at least half of the property owned in the State is personalty.

The legislature of 1907 practically accepted both the majority and the minority reports of the Commissioners. It passed a law the effect of which was to amend the definition of personal property by the insertion of the clause, "*Provided*, That mortgages, notes, accounts, moneys, certificates of deposit, tax certificates, judgments, state, county,

[1] State Board of Tax Commissioners. First Biennial Report, pp. 273 and 289.

municipal and school district bonds and warrants shall not be considered as property for the purpose of this chapter, and no deduction shall hereafter be allowed on account of an indebtedness owed."[1] Tho corporate securities are not specifically mentioned in this law, it seems to be generally conceded that it applies to them as well as to all other forms of property commonly known as intangibles. At the same session it was voted that there be submitted to the people an amendment to the constitution giving the powers recommended by the majority of the State Board of Tax Commissioners.

The exemption of intangibles was promptly contested in the courts, a writ of mandamus being issued, directing the assessor of Lincoln County to list the property exempted by the act. While the contest was still before the courts, the assessment of 1908, the first under the new law, was made. The Board of Tax Commissioners advised the assessors of the various counties that all such property should be listed, but some of them refused to list it. On August 1 the Supreme Court of the State, by a majority of four to one, held that the statute was constitutional except so far as it applied to moneys.[2]

Aside from the purely technical complaint that the act was void by reason of a defect in its title, the ground on which the court was asked to annul it was that it was in violation of that clause in the constitution which requires the taxation of all property in the State except that specially exempted. The position taken by the court was that substantially all the property in the State can be taxed without the taxation of credits,—that to tax them is double taxation. "Double taxation," it said, "should be avoided as far as possible, and in any event the constitution should not be so construed as to require it." Moreover, the constitution makes it just as imperative that taxation on all property should be uniform and equal as it does that all property shall be taxed. It is a matter of common knowledge that

[1] Revenue Laws of the State of Washington, 1907, p. 5.

[2] State ex rel. Wolfe *v.* Parmenter, 50 Wash. pp. 164–184.

the attempt to tax credits is one of the most fruitful sources of inequality in taxation, and the legislature, doubtless, had this in mind when it passed the law. Money, however, "possesses such value by way of immediate purchasing or exchange powers as, in effect, robs it of a mere representative character and clothes it with the dignity of property having intrinsic value." The exemption, therefore, is constitutional, except as applied to money. Justice Fullerton, dissenting, held that credits are property; that to exempt them does not equalize taxation; and that the exemption would allow much property, such as the stock of a corporation that did no business in the State, to escape.

The ruling that money cannot be exempt under the constitution renders incomplete the assessments for 1908 of those counties in which moneys were not listed in that year. An attempt will be made to include, in the assessment of 1909, moneys on hand March 1, 1908, as well as those for the current year.

The question has been raised whether bank deposits are to be regarded as moneys or as credits. The Tax Commissioners have advised the assessors that they should be regarded as moneys and listed as such. The assessor of King County, which includes the city of Seattle, relying on an opinion furnished by the prosecuting attorney, has decided to refuse to list them, and presumably other assessors have adopted the same policy. So the matter may be expected to go before the courts.

With regard to bank stock an anomalous condition exists. The same legislature that passed the act exempting moneys and credits provided for the assessment of the stock of state and national banks. In practise, therefore, the exemption has not been applied to this kind of securities. This may suggest that corporate securities in general should not be exempt; but it seems clear enough that they are property of the same class as the things specifically mentioned. In any event, the view taken by the Tax Commissioners and by many, if not all, of the assessors is that they are exempt; and Justice Fullerton, in his

dissenting opinion, seems to take it as a matter of course that they are. In the opinion of some of the taxing officials the taxation of bank stock, at least as far as the national banks are concerned, is unconstitutional because of its discriminatory character; but as yet none of the banks have seen fit to contest it.

Whether or not the exemption of intangibles has had any effect on the rate of interest it is impossible to say. Only one assessment has been made since the law went into effect; and in many of the counties the law was for the purpose of that assessment disregarded. It is less than a year since its constitutionality was upheld. Since its passage the country has gone through a severe financial crisis. It has been stated that the school districts have been able to place their bonds recently at 4.5 per cent. interest, whereas the rate was previously 5.5 per cent. To this it is replied that the reason why the rate of interest for such securities has fallen is that the State itself has entered the market for them, investing nearly half a million dollars belonging to various special funds. The opinion of bankers and of others who are in a position to observe the prices of securities and the rates of interest is that, while no man can speak with confidence on the subject, there appears to be no change that can fairly be attributed to the law. The fact that intangibles have so commonly escaped in the past is held to be quite sufficient to explain the absence of any effect on the rate of interest or the value of securities.

While the law seems to have had little, if any, effect on the rate of interest, it appears to have reduced considerably, at least in Seattle, the practice of withdrawing bank deposits over the time of assessment. This practise has, in times past, been of such inportance that the banks have been obliged to prepare themselves for it. As a matter of fact, however, the deposits largely escaped assessment even when they were left in the banks, for the assessors very well knew that to require the banks to disclose the accounts of their customers, if that were possible, would

mean that the whole banking system would annually be placed in a serious condition, and that business would be correspondingly disorganized.

It is said that the exemption of intangibles has resulted in the coming into the State of business men and of capital; and individual cases are cited to show that this is true. It is obviously impossible to obtain any general information on the subject. That the exemption has attracted some persons is possible and easily understood; but it is not so easy to see why it should lead non-residents to send capital into the State. So far as capital is tangible, it is no more exempt than formerly. So far as it is intangible it has previously been exempt, as the State does not tax property of this sort in the hands of non-residents. Yet one of the chief arguments for the exemption was that it would attract capital. The president of a prominent Seattle trust company, who takes the view that it has actually done so, explains it by saying that a man who is about to invest in another State inquires about the tax rate, assuming that his investment will be subject to taxation in that State.

As has already been stated, the exemption of intangibles was not desired by a majority of the State Board of Tax Commissioners. Accepting their recommendation that the constitution be amended so as to permit a thorough reform and going beyond the changes suggested by the Commissioners in their report, the legislature of 1907 voted to submit to the people an amendment which would, in effect, remove from the constitution most of the existing provisions in regard to taxation, and substitute the following:—

> The power of taxation shall never be surrendered, suspended or contracted away. Taxes shall be uniform upon the same class of subjects, and shall be levied and collected for public purposes. The property of the United States and of the State, counties, school districts and other municipal corporations, and personal property to the amount of three hundred dollars for each head of a family, liable to assessment and taxation under the provisions of the laws of this State, of which the individual is the actual and *bona fide* owner, shall be exempt from taxation.

This proposed amendment was defeated at the polls in November, 1908, by a large majority. Had it been passed, the Tax Commissioners would have recommended the classification of property with a moderate tax on intangibles, and the separation of State and local revenue, giving to the State the revenue derived from railroads and other public service corporations doing business throughout the State.

The defeat of the amendment is attributed mainly to the opposition of the railroads and other corporations that have largely escaped taxation, of the money interests generally which benefited by the exemption of intangibles, of certain religious bodies that believed that their legal exemption would be overthrown, and to the failure of the friends of the amendment to make clear its meaning and purpose. As to the relative importance of the forces opposed to the amendment, it is difficult to say. The business interests seem to have been the most active in their opposition, and it is said that they did much to work up the opposition on religious grounds. Certain it is that the latter argument did not gain prominence, at least in Seattle, till late in the campaign. One of the arguments most commonly advanced was that it would be very dangerous to intrust to the legislature as much power as the amendment would give them. The Tax Commissioners recommended to the legislature of 1909 the submission of an amendment substantially the same as that which was defeated, save that it provided for the exemption of property used for educational, charitable, and religious purposes. The legislature, however, refused to submit this amendment.

For some years to come Washington is likely to remain bound to the general property tax, with the important modification that what are commonly known as intangibles, except actual money, are not property for the purpose of taxation. In the ordinary course of events no arrangements for the submission of a constitutional amendment will be made before the legislative session of 1911;

action upon it would not be taken by the people till November, 1912; if it were passed, legislation would probably be enacted under it at earliest in the session of 1913; but, unless March 1st were abolished as the time of assessment, such legislation would not go into effect till 1914. The policy of exemption is therefore likely to have a reasonably long trial. The exemption is, of course, dependent on a mere act of the legislature; but it seems improbable that it will be repealed. Such repeal might, however, occur if the banks were to contest successfully the tax that is now laid on their stock.

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BOOKS RECEIVED.

Aftalion, A. Essai d'une Théorie des Crises Générales et Périodiques. Paris: Larose et Tenin. 1909. (Extrait de la *Revue d'Économie Politique*, 1908–1909.)

Bernstein (Ed.). Der Revisionismus in der Sozialdemocratie. Amsterdam: M. G. Cohen. 1909. pp. 48. .75 m. Ein Vortrag gehalten in Amsterdam vor Akademiken und Arbeitern.

Bötzkes, W. Die Seidenwarenproduktion u. der Seidenwarenhandel in Deutschland. Tübingen: H. Laupp. 1909. pp. 145. 4 m.

Brooks, R. C. Odd Prices and Bargains in Retail Trade. Cincinnati: Univ. of Cincinnati. 1908. pp. 28.

Bruneau, L. Les Chèques et Virements Postaux. Paris: Pichon et Durand-Auzies. 1909. pp. 180. 4 fr. (Librairie Générale de Droit et de Jurisprudence.)

Bryan, J. W. The Development of the English Law of Conspiracy. Baltimore: Johns Hopkins Press. 1909. pp. 161. 50 cents. (Studies, Series XXVII., Nos. 3, 4, 5.)

Centre Industriel du Brésil. Le Brésil, ses Richesses Naturelles, ses Industries. Paris: Ailland & Cie. 1909. pp. 404. (Tome I. Introduction, Industrie Extractive.)

Davis, M. M. Psychological Interpretations of Society. New York: Columbia University. 1909. pp. 260. $2. (Studies, vol. xxxiii., No. 2.)

Devine, E. T. Misery and its Causes. New York: Macmillan. 1909. pp. 274. $1.25. (American Social Progress Series.)

De Zuttere (C.). Enquête sur la Pêche Maritime en Belgique. I. Partie: Étude Économique de la Pêche-Maritime. Bruxelles: L. Lebègue & Cie. 1909. pp. 634. 4.50 fr. (Ministère de l'Industrie et du Travail. Office du Travail.)

Diouritch, G. L'Expansion des Banques Allemandes à l'Étranger. Ses Rapports avec le Développement Économique de l'Allemagne. Paris: A. Rousseau. 1909. pp. 798. 12.50 fr.

Duplessix, E. L'Organisation Internationale. Paris: Larose et Tenin. 1909. 3 fr.

Gide, C., and Rist, C. Histoire des Doctrines Économiques depuis les Physiocrates jusqu'à nos Jours. Paris: Larose et Tenin. 1909. pp. 766. 12 fr.

Griffin, G. G. Writings on American History, 1907. New York: Macmillan. 1909. pp. 162.

Halbwachs, M. Les Expropriations et le Prix des Terrains à Paris (1860–1900). Paris: Ed. Cornely & Cie. 1909. pp. 416. 8 fr.

Hall, Bolton. The Garden Yard. A Handbook of Intensive Farming. Philadelphia: David McKay. 1909. pp. 321.

Jenks, J. W. Principles of Politics from the Viewpoint of the American Citizen. New York: Columbia Univ. Press. 1909. pp. 187. $1.50.

Johnston, J. Wastage of Child Life. London: A. C. Fifield. 1909. pp. 95. 6*d*. (Fabian Socialist Series, No. 7.)

Jordan, D. S. The Fate of the Iciodorum, being the Story of a City made Rich by Taxation. New York: Henry Holt & Co. 1909. pp. 111. 90 cents.

McPherson, L. G. Railroad Freight Rates in Relation to the Industry and Commerce of the United States. New York: Henry Holt & Co. 1909. pp. 441. $2.25.

Marx, Karl. Contribution à la Critique de l'Économie Politique. Paris: Giard et Brière. 1909. pp. 354. 3.50 fr. (Traduit sur la 2e Édition Allemande de Karl Kautsky par Laura Lafargue.)

Mathews, J. M. Legislative and Judicial History of the Fifteenth Amendment. Baltimore: Johns Hopkins Press. 1909. pp. 126. 50 cents.

Noyes, A. D. Forty Years of American Finance. New York: G. P. Putnam's. 1909. pp. 418. $1.50. (Second and Extended Edition of "Thirty Years of American Finance.")

Pannett, R. C. Mendelism. New York: Wilshire Book Co. 1909. pp. 109. 50 cents.

Pantaleoni, M. Scritti Varii di Economia. Serie Seconda. Milano: R. Sandron. 1909. 5 l. (Biblioteca di Scienze Sociali e Politiche.)

Pickett, W. P. The Negro Problem. Abraham Lincoln's Solution. New York: G. P. Putnam's Sons. 1909. pp. 580. $2.50.

Schloss, D. F. Insurance against Unemployment. London: P. S. King. 1909. pp. 132. 3*s*. 6*d*.

Società Umanitaria Milano. Disoccupazione Collocamenti Sussidi in Milano nel 1908. Milano: Cooperativa Tipografia degli Operai. 1909. pp. 65.

Webb, Mrs. S., Hutchins, Miss B. L., and the Fabian Society. Socialism and National Minimum. London: A. C. Fifield. 1909. pp. 91. 6*d*. (Fabian Socialist Series, No. 6.)

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